MAR 25 1898

THE IRON TRADE REVIEW

VOLUME XXXI. CLEVELAND, O. JANUARY 13, 1898. CHICAGO, ILL. NUMBER 2

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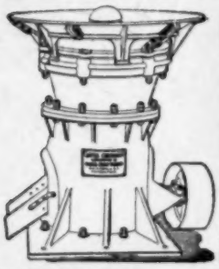

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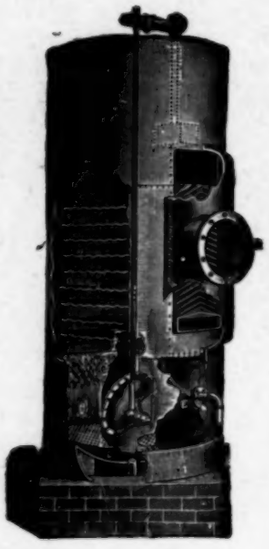

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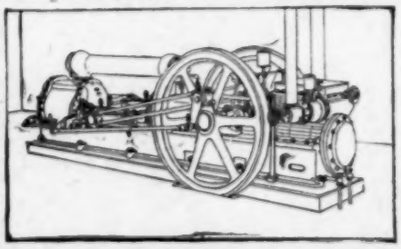

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THE IRON TRADE REVIEW

VOLUME XXXI. CLEVELAND, O. JANUARY 13, 1898. CHICAGO, ILL. NUMBER 2

THE WEEK IN IRON CIRCLES.

Gauged by the volume of current business the iron trade goes quite beyond what could reasonably be expected of January, and in some quarters an ordinary January business has been done in the first third of the month. Apparently the general predictions for the new year are being realized more promptly than the prophets had thought. Yet we find little in present conditions to justify the sanguine prophesies concerning prices that are heard here and there. Satisfaction with so heavy a business is natural, and memory need not turn far back to find a time when such a demand would have sent prices skyward. As things are, the increases in raw material costs may be the extent of market advances for some time to come. The railroads continue to be large buyers. The Pennsylvania Co.'s order for 100,000 tons, taken in connection with its 40,000-ton purchase in the last quarter of 1897, tells of the direct effects of enlarged earnings upon the iron trade. The mills are reaping the benefits in tonnage, of the use of heavier rails; for the 100,000-ton order of last week means no more mileage than 60,000 tons would lay under the old regime. The distribution of the latest order gives the Pennsylvania Steel Co., 25,000 tons; Cambria Iron Co., 25,000; Carnegie Steel Co., Ltd., 30,000; Lackawanna Iron & Steel Co., 5,000; and the Illinois Steel Co., 15,000 tons. It is safe to say that the rail tonnage now booked for 1898 is not far below 1,000,000 tons—an amount entirely beyond record at the second week of the year. The car and locomotive works are in better shape than in several years. Pittsburg mills especially are seeing the effects of requisitions in these lines. On the prevailing price basis the concentration of orders in the hands of mills favored with lowest cost is a continuing feature, and the East is giving further evidence of the advantages enjoyed by Pittsburg and farther Western plants. Bessemer pig iron has sold at $9.25 for January delivery, and some second quarter business has been done at $9.50. Steel billets are firm at $15, Pittsburg maker's mill, with a $14.90 transaction reported, Ohio River mill. Ten days of trading have made a good start for Southern iron. A number of buyers have been in the market, and prices have been maintained at $7.25 Birmingham for No. 2 and $6.50 for gray forge, while some sellers hold for 25 cents more and are quite firm. Car wheel demand has taken up a considerable tonnage of coke Bessemer and of charcoal irons. In general the effect of holiday stock accumulations has been seen throughout the pig iron market in slight concessions. The structural mills are getting a satisfactory tonnage thus early in the year, and in general the new schedule is being adhered to, though reports indicate that just before the advance some buyers were given an opportunity to get under cover, by the option route. There is greater firmness in universal plates, which are being held at $1 to $2 a ton higher by some sellers. Bars are unchanged and weak, with demand only moderate.

THE CLEVELAND DISTRICT.

The total of Lake Superior iron ore shipments in 1897, as gathered by *The Iron Trade Review* from mine officials, and checked in large part with the figures to sales agents, is 12,457,002 tons. The common prediction would give a record of about 14,000,000 tons in 1898; if this be any approximation of the actual, the problem of the Bessemer pool organizers will be simplified. The two Mesabi interests that locked horns over tonnage last year can both be satisfied in the matter of allotment, it would seem, without any prejudice to other interests. The leading consuming producer on the Mesabi is understood to be favorable to a price arrangement, and the prospects for agreement, with only tentative expressions in conference thus far, seem better than at the corresponding date last year. It is understood that all of the Metropolitan Iron & Land Co.'s stock is now in the hands of the Oliver interest, the last of it being acquired in the latter part of December.

Pig Iron. Purchases of Bessemer pig iron by a Northern Ohio steel interest have been made in the past week, the total being about 40,000 tons. Deliveries for the most part run through the second quarter. It is understood that these net valley furnaces from $9.45 to $9.60. Some metal has been sold for January delivery at $9.25, furnace. Some business in spiegel and ferromanganese is reported locally, about 6,000 tons of the former and 1,200 tons of the latter being reported closed. Foundry iron is being inquired for more generally than is usual in January and several sales were closed by valley interests. The price is a shade below $9.50 at valley furnace for No. 2. Charcoal iron is somewhat more active at prices closer to the Bessemer basis than heretofore. We quote Cleveland delivery:

Bessemer	10 15	Valley Scotch No. 1	$10 65@10 75
No. 1 Strong Foundry	10 50@10 75	Valley Scotch No. 2	10 15@10 40
No. 2 Strong Foundry	10 00@10 25	Gray Forge	9 25
No. 3 Foundry	9 25	Lake Superior Charcoal	12 00

Finished Material. The great eight-track swing bridge for Chicago Drainage Canal has been taken by the King Bridge Works, of Cleveland, and 4,800 tons of material will be required, a considerable portion of it going to Pittsburg. The local bridge works are thus provided with work, which with other contracts recently taken ensures full employment for some time. A 1,000-ton contract for boiler plates was closed in this market in the week and 500 tons of structural material for a Northern Ohio works. A 2,000-ton rail order is also reported. There is a somewhat firmer market in plates, some Pittsburg mills quoting 1.05c for tank, while on some open-hearth business 1.10c has been quoted. Bars continue weak, and Pittsburg mills that have attempted to maintain 1c are met with valley quotations of .95c to 1c. at mill and at points west of the Mahoning Valley, mills in that district are getting the bulk of the business. The wire mill appraisers have finished in Cleveland, but the accountants may be busy here for some weeks and it is not probable the reports can be made before March 1.

CHICAGO.

OFFICE OF *The Iron Trade Review*,
1142 MONADNOCK BLOCK, Jan. 12.

There have been no new developments in the trade in the week, and no considerable activity in the market. Mill and furnace men are of the opinion that the expected large sales will not be long in materializing, and that the last half of this month will show a large tonnage closed. Inquiries in all branches of the trade show a decided improvement over the last two weeks of the old year, and are of such a nature as to induce the belief that the inquirers will not delay long in placing their orders for the material required. The Illinois Steel Co. got a share of the steel rail business placed by the Pennsylvania Railroad last week, the rails rolled here being for the lines west of Pittsburg, with a prospect that further work is to be done on that portion of the system. The demand for all kinds of steel continues large, and the confidence expressed by mill representatives recently has not abated at all. On the contrary, there is a continually growing feeling of hope for what this year will bring. The feature in pig iron is the independence of the Southern producers. Some of the agents, in meeting competition, have taken orders for iron at prices lower than those authorized by the furnaces, and when these were given in to the latter they refused them, and in some cases the orders had to be canceled by the agents. The furnaces are holding firmly to the quotations given below, and several refusals to make concessions from these figures are noted. Northern furnaces are also firm in their views, and are selling steadily at the quotations. Demand is increasing all the time, and while orders in the past week were not very large, there is promise that business will increase materially within a short time. We quote:

Lake Sup. Charcoal	$12 50@13 00	South'n Coke No. 3	$10 10@10 35
Local Coke Fdy. No. 1	11 00@11 50	Southern No. 1 Soft	10 60@10 85
Local Coke Fdy. No. 2	10 50@11 00	Southern No. 2 Soft	10 35@10 85
Local Coke Fdy. No. 3	10 25@10 50	South'n Silveries	11 25@11 50
Local Scotch Fdy. No. 1	11 50@12 00	Jackson Co. Silveries	12 50@14 50
Local Scotch Fdy. No. 2	11 00@11 50	Ohio Strong Softeners	12 00@12 25
Local Scotch Fdy. No. 3	10 50@11 00	Alabama Car Wheel	16 00@17 00
South'n Coke No. 1	10 60@10 85	Malleable Bessemer	10 75@11 00
South'n Coke No. 2	10 35@10 85	Coke Bessemer	11 50@12 00

BARS.—There continues to be a good demand for both iron and steel bars, and sales in the week were very satisfactory to the mills, including several lots of 1,000 tons and larger. Car builders are taking a large share of the business placed, and there are no signs of a falling off in their trade. Prices are not at all weak, and are made at 1.05c to 1.10c for common iron, 1.10c to 1.15c for guaranteed, and 1.10c to 1.15c for soft steel bars from strictly billet stock.

CAR ORDERS.—No large contracts for cars were placed last week, but several small orders were given out, and there are a number of lots to be placed in the near future. Material men report good sales of all kinds of car material, and an excellent demand still coming in. Sales of axles have been very large for the past month.

RAILS AND TRACK SUPPLIES.—The local mills are reported to have taken 15,000 of the 100,000 tons of steel rails recently placed by the Pennsylvania railroad. Sales of rails have been good, although no especially large contracts are reported. Quotations are unchanged, as follows: Rails, $20 to $22.50, according to specifications; steel splice bars, 1.20c to 1.30c; track bolts, with square nuts, 1.80c to 1.90c; hexagon nuts, 1.90c to 2c; spikes, 1.60c to 1.65c.

BILLETS AND RODS.—No sales, except for small lots, have been made by the local mills in the week. Eastern mills have made some sales in this market, but none of very large size. Prices are quotable at $17.50 for billets and $25.25 for rods.

STRUCTURAL MATERIAL.—The material for the two smaller bridges of the Drainage Canal, amounting to about 1,600 tons, was finally placed last week, going to the Carnegie company. The largest bridge is still in statu quo, but will undoubtedly be given out this week. No other large business has been placed, and nothing new has come into the market. There are several projects on the boards which will come up to be bid upon soon, and will take considerable steel. The market is very firm, and prices are as follows: Beams, 15-inch and under, 1.30c to 1.35c; 18, 20 and 24-inch, 1.40c to 1.45c; angles, 1.15c to 1.25c; plates, 1.15c to 1.20c; tees, 1.35c to 1.40c. Small lots from stock are quoted at one-quarter to one-half cent higher.

PLATES.—Several good orders for plates were given out last week, and further business is expected to be placed immediately. The local mills are getting a large share of the business going. Most mills are maintaining prices about as we give them, but some cuts have been made to secure desirable business. Prices are made as follows: Tank steel, 1.15c to 1.20c; flange steel, 1.40c to 1.45c; fire-box steel, 1.85c to 5c.

SHEETS.—Business has been quiet and very little has been given out since the first of the year. Almost all the orders going are for small lots. Quotations are made at 2.20c to 2.25c for No. 27 black and 80 and 7½ per cent discount for galvanized.

MERCHANT STEEL.—Considerable business has been placed, mostly in small lots from store, although some mill business has come in. The demand is fairly large, and is expected to increase. Prices follow: Open-hearth spring, tire and machinery steel, 1.65c to 1.75c; smooth finished machinery steel, 1.60c to 1.65c; smooth finished tire, 1.45c to 1.50c; tool steel, 5.50c to 7.50c; specials, 11c and upwards.

SCRAP.—The demand has been light, and sales were not at all large last week. Dealers are expecting an increase in business before the end of the month. Dealer's selling prices are as follows:

Old iron rails, gross	$12 00@$12 50	Axles, net	$14 00@$14 25
Old steel rails, long, gr.	10 50@ 11 00	Cast borings, net	4 00@ 4 25
Old steel rails, short	9 00@ 9 25	Wrought turnings, net	5 50@ 6 00
Old wheels, gross	10 50@ 11 25	Axle turnings, net	7 25@ 7 50
Railroad forge, net	11 75@ 12 00	Mixed steel, gross	7 00
Dealer's forge, net	9 00@ 9 50	Stove plates, net	6 00@ 6 25
No. 1 mill, net	8 00@ 8 50	Heavy melting steel, gr.	8 00@ 8 25
Heavy cast, net	7 75@ 8 25	Old iron splice b., net.	13 25@ 13 75
Malleable cast, net	8 00@ 8 50		

PITTSBURG.

OFFICE OF *The Iron Trade Review*,
807 TRADESMEN'S BUILDING, Jan. 12.

As records of production in December have been closed up the remarkable activity of that month has been emphasized. The tonnage of Jones & Laughlins, Ltd., and also of the Carbon Steel Co., was heavier in December than in any month in their history. January, in finished material, has opened up at a lively pace, in the mills, and further large orders have been placed. Of the Pennsylvania Railroad's 100,000-ton rail order Pittsburg will roll 30,000 tons. In sheet bars and rods sales have also been large, and the supply of the latter is said to be limited. The appraisers of the American Steel & Wire Co. have been engaged in Pittsburg during the week and have completed their work here.

PIG IRON.—The purchases by the Lorain interest are the interesting feature of the week in Bessemer pig, although Pittsburg was not directly involved. Upwards of 15,000 tons is said to have been taken at prices ranging from $10.15 to $10.25 Lorain, some deliveries running beyond the first quarter. Prompt Bessemer through Pittsburg selling agents is quoted at $9.25 valley, while first quarter deliveries are quoted at $9.50, valley. In foundry iron a recent sale is announced of 1,000 of extra No. 2 at $10.40. Gray forge in Pittsburg keeps on a par with the valleys, $9 to $9.10 being quoted. Quotations are made as follows:

Bessemer, prompt, valley	$	$ 9.25
" first quarter, valley		9.50
Bessemer delivered Pittsburg District	10.00 to	10.15
No. 1 Foundry	10.75 to	10.90
No. 2 Foundry	10.25 to	10.40
No. 3 Foundry		10.00
Gray Forge	9.00 to	9.10

BILLETS.—Mills report a good aggregate of billet sales, composed of lots of 2,000 tons and under. Shipments into the second quarter are more in demand than prompt deliveries but at present rates are not acceptable to the mills. The market is quoted at $15 maker's mill.

SHEET BARS.—Tin bars have been well bought up for six months but sheet bars have not been heavily booked beyond the first quarter. There is a more general desire to cover on the part of sheet mills, but there are instances of mills delaying purchases in hope of better prices. Steel works are not anxious to sell beyond April 1 and are quoting $18 and $18.25 on first quarter deliveries. A sale of 1,500 tons at $17.15 maker's mill for January and February delivery, is reported.

RODS.—The supply of rods is reported as small and higher prices are made. Sales of rods during the week have been heavy, prices being quoted from $23.50 to $24. The appraisers of the American Steel & Wire Co. finished their work in Pittsburg during the week.

SHEETS.—Notwithstanding a very heavy inquiry for sheets of all sizes there is a disposition to put off buying. In consequence several mills are running very close to order books.

At the same time none are willing to sell for six months ahead, as they are urged to do by larger buyers. Many are not covered on sheet bars beyond March and do not care to take the risk of making costs. No. 28 black sheets, nominally quoted at $2.10, are firm at $2 to $2.05.

RAILS AND TRACK MATERIAL.—The Pennsylvania Railroad during the week placed orders for 100,000 tons of 100-pound rails, of which 30,000 tons will be rolled at the Pittsburg mill. Inquiry for the needed fittings has also been made. Rail prices in the main are firm at $18 mill, although rumors are heard of lower figures being made. Track material is quoted as follows: Iron track bolts, 1.65c to 1.70c; steel spikes, 1.45c to 1.55c; splice bars, 1.10c to 1.15c; links and pins, 1.15c to 1.20c.

IRON AND STEEL SKELP.—The inquiry for all grades of skelp is good but a tendency is noticed to defer buying until actual necessity compels it. We quote: Grooved iron skelp, 1.07½c to 1.10c; sheared iron skelp, 1.17½c to 1.20c; grooved steel skelp, 92½c to 95c; sheared steel sklep, 1c to 1.02½c.

PLATES.—The Chicago, Burlington & Quincy order for 20 new locomotives given the Pittsburg Locomotive Works, carries with it the specification that the special boiler and firebox steel of a Pittsburg interest be used. Railroad work in prospect is very heavy and ahead of even the active months of last year. The contract awarded the Riter-Conley Co. for the erection of a gas plant, involving the use of 3,000 tons of plates which have already been placed with Pittsburg mills quote: Bessemer and open-hearth tank, 1c; shell, 1.10c; flange, 1.20c.

STRUCTURAL MATERIAL.—On new beam business 1.15c is quoted firmly but rumors of evasions are already heard. Large viaduct work in New York is still pending and on its settlement hangs the placing of 3,500 tons of material. By agreement the beam makers are also asking as minimum 1.15c on zees, 1.20c on tees and 1c on universal plates.

PIPES AND TUBES.—Jobbers have begun to buy in the week and a heavy business in merchant pipe is expected as the season advances. Two lots of ten miles each of line pipe have been closed by a local mill. Business in oil country goods and boiler tubes continues very heavy. Mills are holding the base discounts with an extra discount of 10 and 5 per cent on car load lots. Butt weld black, 72 per cent off; lap weld black, 78 per cent off; butt weld galvanized, 67 per cent off; lap weld galvanized, 70 per cent off. Discounts on merchant boiler tubes are as follows: 2¼-inch and smaller, 72½ per cent off; 2½-inch and larger, 75 per cent off.

FERRO MANGANESE.—Domestic ferro-manganese, 80 per cent, is quoted at $47 and $47.50.

SPELTER.—Spelter is firmer and is quoted at $3.82 and $3.85. A sale of 50 tons is reported at $3.82, Pittsburg.

BARS.—Mill quotations on steel bars are 1c minimum and is being generally maintained. On bar iron 95c valley and 1c Pittsburg are still quoted and 1.25c to 1.30c on branded all-muck bar.

OLD MATERIAL.—Old rails, both iron and steel, have been selling actively, as is customary early in the month. Sales by railroads have been made of steel rails at $10.75 and of iron rails at $13.75 valley. A 1,000-ton sale of steel rails is also reported at $10. Wrought scrap has sold at $11.50, net, and other sales are reported at $11, net ton. Cast scrap is quoted at $9.25 gross and car wheels, $10.50 gross.

IN OTHER MARKETS.

[SPECIALLY REPORTED FOR THE IRON TRADE REVIEW.]

Cincinnati. The first ten days of the new year have been encouraging for Southern iron. A lower range of prices is established, still they are, it is claimed, remunerative; and the volume of business is large, with indications that it will continue to improve. A few of the larger manufacturers have secured enough iron to suffice until the last of the present half year, but the majority are now ready to make new contracts. In lots of 1,000, 2,000 and 3,000 and one lot of 5,000 tons the volume of business has aggregated not less than 40,000 tons, of which at least 25 000 tons is Southern. No. 2 foundry is in moderate demand and has sold on the basis of $7.25 Birmingham, and this price cannot be shaded. Forge iron has sold in considerable quantities on the basis of $6.50 per ton. By some of the furnaces outside of the Birmingham district there has been some cutting of prices to effect business, but this has not materially influeced trade. The reason so few large concerns have contracted for iron for the next six months, is the expectation of increased production and continued low prices. Through their Eastern connections some Cincinnati houses have made some large sales of Northern irons in the Eastern markets. As far as can be learned here, the market for Northern irons is less stable than that of the Southern irons, competition is sharper, and the furnaces more anxious to sell. The greater activity of the car works is increasing the sales of charcoal iron to some extent, but the demand is much less than in former years when the price of old wheels was relatively higher and a larger proportion of charcoal iron was used in mixture. We quote for cash f.o.b. Cincinnati: Southern coke, No. 1 foundry, $9.75 to $10; No. 2, $9.50 to $9.75; No. 3, $9.25 to $945; Gray forge, $8.75 to $9; mottled, $8.75 to $9; No. 1 soft, $9.75 to $10; No. 2, $9.50 to $9.75; Hanging Rock charcoal, No. 1, $14.50; to $15.50; Tennessee charcoal, No. 1, $12.50 to $13; Jackson Co. silvery, No. 1 ,$12.50 to $13; Standard Georgia car wheel, $14.25 to $15.

Buffalo. If the first week of the new year can be taken as the "straw" which indicates the way the "wind blows," then we can with confidence look forward to a prolonged period of general prosperity in the foundry iron business in this district. Ordinarily the early new year is spent by both consumer and producer in reviewing the year just past, in looking over the ground and laying plans for the coming year. Generally very little business is done in the line of pig iron purchases, but during the week just past more iron has been sold than during the whole month of January last year. The market has been very firm and the inquiries indicate a more generous and much earlier interest in the foundry iron market. The market to-day is practically $1 per ton under that of a year ago; foundries are melting nearly double the amount consumed then and on all sides are reports of increasing consumption, with less iron on furnace yards than at any time for years past. One concern that a month ago considered a small purchase made then as being its requirements for six months has just recently found it necessary to more than double the last order. With a firm and unyielding market and more attention being paid to obtaining a favored brand rather than to save a few cents per ton, we quote on the following cash basis f.o.b. cars Buffalo: No. 1 strong foundry coke iron, Lake Superior ore, $11 to $11.25; No. 2 strong foundry coke iron, Lake Superior ore, $10.50 to $10.75; Ohio strong softener, No. 1, $11.50 to $11.75; No. 2, $11 to $11.25; Jackson Co. silvery, No. 1, $14; Southern soft, No. 1, $11.75; No. 2, $11.35.

Personal.

E. C. Pope, so long known in the iron ore trade, and especially as the sales agent of the Norrie ore, terminated his connection with Pickands, Mather & Co., Cleveland, with the opening of the year, and is now in his old offices at No. 11 Wade Bldg., Cleveland. In addition to handling iron ore, Mr. Pope will give attention to the business of the Permanent Rail-Joint Co., of which he is secretary and treasurer. Mr. J. L. Pope, the patentee, is president of the company.

President Charles M. Schwab of the Carnegie Steel Co., Ltd., sailed on Wednesday for a four weeks' European trip.

Edward Le Bas, of Edward Le Bas & Co., sales agent in England for the Illinois Steel Co., the Consolidated Steel & Wire Co., and the National Tube Works Co., is on the way to this country for the purpose of going the rounds of the various works which his firm represents in Europe.

H. B. Miller, formerly superintendent of the Duquesne Steel Works, is now connected with the Illinois Steel Co., being in charge of new construction at the South Works.

General Manager E. C. Converse, of the National Tube Works Co., gave a dinner last Wednesday evening, Jan. 5, at the Manufacturers' Club, New York, to his associates in the company, commemorating his completion of 25 years' connection with the National Tube Works Co. Besides the resident directors and officials of the company there were present General Sales Manager Edward Worcester and Superintendent Horace Crosby, of McKeesport, the Pittsburg manager, H. W. Bishop, and the sales agents of the company—21 guests in all. The surprise of the evening was the presentation to Mr. Crosby of a solid gold loving cup eight inches high, the gift of his associates in the company.

THE IRON TRADE REVIEW

DEVOTED TO IRON AND STEEL MANUFACTURE, FOUNDRY AND MACHINERY TRADES.

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ENTERED AT THE POST OFFICE AT CLEVELAND, O., AS SECOND CLASS MATTER

JANUARY 13, 1898.

THE "revolutions" in iron and steel manufacture have been so plentiful in the past few years that no great sensation is produced by the announcement in newspaper dispatches that Edison has discovered a mixture of cast iron with another metal, giving a product with the toughness and strength of wrought iron. What the other metal is and what the proportions of it and of cast iron, are not stated, but definite announcements are promised after further experiments. Some new method of treating cast iron, so that it shall take on the properties of steel or of wrought iron, has been a favorite phantom of experimenters. So many repeated claims have been made of a successful solving of the problem, all of them proving to be founded on haps, impossible of deliberate repetition, or to involve processes no cheaper than familiar ones, that skepticism is the natural reception of such a story as the telegraph now brings.

WHAT has been predicted on the strength of the heavy traffic, particularly in grain, in the past three or four months, and what has been indicated by the activity of car and locomotive works of late, tallies with what the *Railroad Gazette* has found upon inquiry, as to the equipment requirements of the railroads in the next six months. Roads owning 810,000 freight cars, or two-thirds of the freight car equipment of the country, tell the *Railroad Gazette* that they will need to order 24,000 freight cars between now and July 1. If the others order in like proportion, estimating also 2,000 cars for new lines, the car orders of the first half of 1898 will be 38,000, or within 13,000 of the number built by contracting shops in the whole year 1896, and equal to the number built by such shops in 1895. For 1897, the total was 45,588 cars, or about 60 per cent of the indicated total for this year, presuming that present plans are carried out and that the second half of the year is as productive of work in this line as the first half. Railroads owning two-thirds of the engines of the country say that they will need 243 new locomotives in the first half of 1898. From this the *Gazette* assumes orders for 360, and, counting new roads, probably 400. Last year the total built for 12 months was 1,251. The estimate for the first half of the year indicates a total of 800 for the year 1898, but this takes no account of exports, which for 1897 are likely to be officially reported close to 300, possibly more. The indications are, therefore, for a heavy run of work at car shops in the coming year, and for locomotive works, if the foreign demand increases as it has done in 1897, about such a business as they have seen in the past two years.

THE closing down, late in December, of the Troy Steel Co.'s plant at Breaker Island, and the report which now comes, after a fortnight's idleness, that the shut-down is indefinite, with a probability that the plant will not be operated unless prices advance materially, emphasize again the revolution of 1897 in the iron trade. Hon. Abram S. Hewitt's statement to the New York *Times*, given elsewhere, that for the manufacture of crude iron in the East there is no hope of better times, the industry there being prostrated by the overwhelming competition of the South and the Central West, may have been too sweeping, but the general tenor of his comment on the changes in the trade accord with the statement that comes from Troy. At Pittsburg some of the more important producers made by far the largest three months' output in their history in the last quarter of 1897, and in some cases the month of December, usually one of the lightest of the year, exceeded all records. A significant commentary on the drift of business is found in the distribution of rail tonnage under an open market, the mills nearest the center of economical production getting the bulk of the work given out for 1898. Proximity to the sections of the country in which track-laying, both for renewals and new milage, is greatest, explains the destination of this business, to be sure; but the point is that with the large margin on rails and the more even distribution of tonnage under the old regime, such of the Eastern plants as rolled rails, were able to make sacrifices on other material to meet Western prices. To-day, with no artificial prices, proximity to cheapest raw materials, added to thoroughly modern equipment, will determine more than ever the drift of orders. Sweeping generalizations are to be avoided, in speaking of changes of so recent date as 1897; but we believe that when the statistics of production of iron and steel in 1898 come to be published, district by district, it will appear that 1897 was more of an era-marking year than is generally appreciated at this close range.

THE exports from the United States in November have been officially footed, the total being $114,639,664, as compared with $107,821,778 in November 1896. For the 11 months ending Nov. 30, 1897, the total was $956,675,874, against $870,742,922 in the corresponding period in 1896. A feature that will attract attention is the increase in agricultural exports—$87,743,044 in November, as against $80,692,990 in November 1896. The manufactured exports were almost identical in the two Novembers—

$21,685,673 in November, 1897, and $21,639,073 in November, 1896. For the 11 months of 1897 the percentage of exports of manufactured goods was 26.78; in 11 months of 1896 it was 26.41. The November, 1897, percentage of manufactured goods was 18.91 as against 20.07 in November, 1896. Up to two months ago the increase in manufactured exports over corresponding periods in 1896 was steady. Whether the expansion in this direction has been arrested, and if so, why and for how long, are interesting questions. In view of the phenomenal export of grain of late, generalizations as to developments affecting home manufacture are premature. Whether increasing home demand has somewhat dulled the eagerness of our manufacturers for outer trade is a question worthy of attention.

METHODS OF KEEPING FOUNDRY COSTS.

The obtaining of exact foundry costs is, on the face of things, more difficult than the fixing of machine-finishing costs, as the foundry cost involves a multitude of obscure factors, or elements which can be made to appear obscure to some minds. Hence, perhaps, has come the quite erroneous practice in some establishments of charging all foundry labor directly to expense, laborers and molders alike, assuming that the molder's labor is so small an item as to be neglected without detriment to practical accuracy. So slipshod a method does not preserve sufficient detail of expenditure to enable the formation of estimates of such accuracy as is required in competing bids for work. The prime-cost and total-cost of castings should be estimated by the method used for machine work.

The general problem of total-cost estimating is perfectly simple when the prime-cost and expense totals are known, because the whole expense must be added to the respective prime-costs, so that the sum of the total-costs shall equal the sum of the prime-costs and the expense. Simple as this procedure seems, it can be complicated in many ways, and may even be viewed in such lights as to leave certain large items of the expense account out of the total-cost estimates.

In point, total-cost estimates, as made by several large and carefully regulated establishments, do not include interest on the value of the plant. This is a most unwarrantable omission. If the plant were rented, the rent would undoubtedly be included in the expense account and duly distributed as a part of the total cost of the machines built. Again, if the plant were sold, and its value in cash loaned, the lender would expect to receive interest on the amount, as a matter of course. Viewing the shop or plant as an individual entity transacting business for itself, the case is the same; the plant carries an indebtedness to some one, equal to its cash value, present or original. This indebtedness is necessitated by the creation of the plant, and interest on this amount is certainly a part of the general expense account, so long as the indebtedness exists. This indebtedness can be cancelled only by the earnings of the shop above total expenses. Profits of operating the plant might be credited to the shop, until this indebtedness and interest were cancelled and the original investors in the concern had their money back again. In this case the shop would own itself and be in debt to no one, and the interest charge would rightly disappear from the general expense account, but, until this establishment-cost is liquidated in some way, the interest charge in the expense account is certainly legitimate.

As an exhibition of actual practice, the following estimate of founding costs is taken from the form of the Builder's Iron Foundry, which has always made large amounts of castings for sale:

1. Estimate fully time cost of core-makers, molders, and helpers.

2. Estimate fully cost of pig iron piled in the yard, adding for waste 9.13 per cent.

3. Examine melting book to determine average cost per gross ton for the last four weeks; to this average cost add 34.2 per cent., which will make a total equal to the cost of melting each net ton, covering waste and remeltings.

4. For cartages add 88 cents per short ton.

5. Molding materials equal 36.13 per cent of producer's wages.

6. Foundry labor, $3.75 per ton.

7. Yard expenses, cleaning and shipping, $3.50 per ton.

8. Fixed charges. These will vary with number of producers,—viz., molders, molders' helpers, and core-makers. The number of these men on the time book is taken as the base, as the average output per same number of producers' names is almost constant.

With 100 names in work, on order under estimate add for fixed charges 50 per cent of total producers' wages.

For 90 names add 55.5 per cent.
For 80 names add 62.5 per cent.
For 70 names add 71.5 per cent.
For 60 names add 83.33 per cent.
For 50 names add 100 per cent.
For 40 names add 125 per cent, and
For 30 names add 166 per cent.

As the Builder's Iron Foundry pays great attention to turning out heavy loam work, these figures are worthy of especial attention from a commercial point of view, or, in other words, may be regarded as giving direct informaton of commercial value to other firms in the same line. Some other establishments refused their actual addition percentages on this very ground that the giving of these percentages would be of assistance to their competitors, while in the same breath lamenting the want of correct knowledge which led those competitors to often fix selling price below living rates. All American manufacturers of metal work who were seen in this connection were emphatic in their statements that it would be of great benefit to all concerned if correct information were supplied, leading to the fixing of correct total-cost and selling-estimate figures; but some refused the disclosure of their own percentages. In general terms, the larger the force of hands working, the smaller the percentage of expense to be charged against the labor of each. Thus the percentages at the Builder's Iron Foundry range from 50 per cent when 100 molders are at work to 166 per cent for the minimum number of 30 hands.—[Henry Roland in Engineering Magazine.

New England and Old England Shop Methods.

Hiram S. Maxim in an article in the *Engineering Magazine* on "Automatic Machinery the Secret of Cheap Production," says:

"In New England the manufacturer is always seeking something new; he cannot afford to use old or imperfect tools. In England the tendency of the manufacturer is never to get a new tool so long as there is anything left of an old one. In New England the manufacturer, as a rule, takes great pride in the cleanliness and order of his shop. He thinks of nothing but his business, and of bringing it to the highest degree of perfection. He has no interests outside his factory. In England, on the contrary, the manufacturer is apt to look on his works only as a necessary evil. As a rule, he take very little interest in what is going on, does not identify himself with the working people at all, and is always looking forward to the time when he shall retire from business and have nothing more to do with commerce or manufacture. In New England the working mechanic takes great pride in learning his profession thoroughly. He 'talks shop' in season and out of season, and, as a rule, has a very extensive and well selected kit of tools. The British mechanic looks upon his trade only as a badge of servitude; he never thinks of his business when he is not obliged to, and, as far as tools are concerned, is often contented with a center punch and a hammer. But this relates principally to the majority of English shops of 15 years ago. I have noticed that the introduction of new American tools and machinery into England, especially those made by Messrs. Pratt & Whitney and Brown & Sharpe, has opened the eyes of many of the manufacturers, and many shops in England at the present moment are being equipped with American tools. This is especially true in bicycle work. Still, there are a great many English factories that would be greatly benefited by a fire, or, in fact, anything that would destroy their old tools."

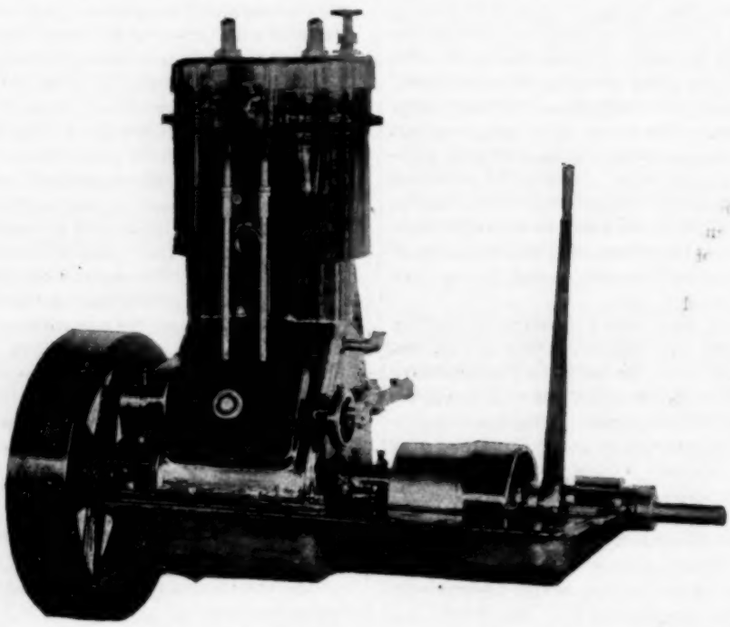
THE KING GASOLINE LAUNCH ENGINE.

The Charles B. King Co., of Detroit, has brought out a new gasoline launch engine, shown in the accompanying cut. Simplicity and compactness have been aimed at, in accordance with the demands of launch service. By pulling out the relief rod the fly wheel is easily turned. Two slow revolutions are enough to start the engine under way. The relief rod is then pushed in and the engine is ready for its work. No hand crank is required.

The electric igniters do not require attention and, it is said, will last as long as the engine. The reversing gear is made a part of the engine and the use of a propeller with reversible blades is avoided.

Oil cups are dispensed with, all of the working parts. cylinders included, being freely oiled by the dashing of the cranks through the oil contained in the crank case. A supply chamber outside indicates the oil level and at such times as necessary the oil can be replenished.

The engine operates with an impulse at every other turn in each cylinder and the exhaust is rendered silent by passing out under the water. This is arranged in such a way that there is no back pressure. The engine as shown in the cut



THE KING GASOLINE LAUNCH ENGINE.

is rated as 6 h. p., but develops 7½ h. p. Its actual weight is 700 pounds. It is especially designed for auxiliary cruisers and cabin launches. They can be placed in confined spaces and not give out disagreeable odors. An exhibition launch is now running on the Detroit River. Details of weight, sizes, etc., will be given by the manufacturers.

THE stock columns of an Eastern newspaper refer to the recent strength of Cambria Iron Co. shares and say that it is due to the fact that the company is a modern concern with modern facilities which it keeps up at great cost, and which enable it to maintain a low cost of production in all departments. The company is reported to have large orders for steel rails and is full on other departments. In the same report reference is made to a recent break in Pennsylvania Steel Co. shares, with large buying at the low prices. The facilities of the Sparrow's Point plant for manufacturing for the export trade are evidently regarded by the buyers as giving good promise for thefuture of this stock.

THE National Association of Manufacturers, which holds its third annual convention in New York, Jan. 25-27, now has 1,000 manufacturers enrolled as members, representing in capital invested, number of people employed, and value of products an aggregate greater than any other business organization in the world.

THE RAILROAD BOND MARKET IN 1897.

The transactions in all kinds of bonds in 1897 exceeded in volume any previous years. In State and railroad bonds alone the aggregate on the New York Stock Exchange was $529,343,000. In 1896 the aggregate was $358,815,850. The largest previous record was $501,398,200, in 1892. The aggregate of Government bonds sold in 1897 was $10,134,030, which compares with $27,121,550 in 1896. The large returns of 1896 were due to transactions arising from the Treasury issues.

The heaviest month's business was in August, when the total for railroad bonds was $74,631,050. The next largest was September, the total being $67,297,800. The smallest returns were $22,227,300, in April; the third in point of size was $61,287,450, in December. These figures and dates serve to outline the course of the year's market. In April, when the demand was the lightest, prices were the lowest. Likewise the activity of August and September was attended by practically the highest prices. From the maximum figures prices reacted moderately in the last quarter of the year, and at the close had a recovery more or less general, which in many important instances advanced to the highest figures of the year.

Among the causes of the better market we may mention a revival of confidence coupled with difficulty in finding profit able and safe investments; the comparatively substantial yields offered especially early in the year; a big crop, and, for the first time in a decade, an opportunity for the farmer to sell at the high prices guaranteeing a heavy Western as well as Eastern movement of traffic; and the success attending the refunding of the Lake Shore bonds on a 3½ per cent basis. This became known in February, and was really the start in the advance in stocks and bonds that developed in the summer and early fall.

Wall Street at that time was not a stranger to a 3½ per cent bond at par, but the instances were rare; among them a certain minor issue of the Pennsylvania Railroad and one of the Illinois Central. However, in these cases insiders and not the public made the market for the securities; a demand for $50,000,000 3½ per cent bonds at par or thereabout was indeed a novelty. It can be said to have opened a new chapter in railroad financiering, and to have caused a material modification of the views of capitalists regarding interest returns. This has been demonstrated by a reduction in the savings bank rate of interest in important instances this fall from 4 to 3½ per cent. The success of subsequent low rate issues of different prominent railroads, of which the Rock Island is the latest example, indicated the tendency of capital and exercised a very powerful influence in advancing values of railroad securities generally.

This ability of the railroads to float a four per cent refund-

ing issue will, in the next seven years, reduce fixed charges by approximately 16¾ million dollars. Could the refunding bonds bear a uniform rate of 3½ per cent the saving would be 20¼ million dollars. The *Financial Chronicle*, from whose columns this estimate is taken, judges that from 1897 to 1905, both inclusive, $710,689,262 in bonds, bearing five per cent or more interest, will mature.

There is a tendency among railroad managements which have bonds to retire in the near future, to provide an issue not only large enough to take up all the outstanding indebtedness, but to provide for requirements many years ahead. This has been known in the past to result in dropsical securities.

In the table following will be found the average changes of the different groups in the year:

Groups.	Change.
Eastern	— 1.25
Granger	+ 5.57
Southwestern	+ 8.03
Transcontinental	+ 4.78
Trunk lines	+ 2.01
Southern	+ 2.30
Western	+ 2.18
Coal, anthracite	+ 2.48
Coal, soft	— 1.70
Miscellaneous	+ 8.875
Street railways	+ 3.07
Governments	+ 2.86

The greatest gains were made by the Southwestern issues. This is due largely to the speculative character of many of those bonds, and particularly to the sharp improvement of the Atchison issues, following a satisfactory reorganization. Next in appreciation stand the Grangers. A gain of over 5½ per cent reflected a demand based upon good crops and heavy traffic. The Transcontinental holds fourth place. Northern Pacific securities played a very prominent part in making this average high. The most substantial gains of the year, and those in all likelihood which will be maintained, were recorded by the Trunk lines. Like the improvement in governments, it was over two per cent. Perhaps this movement in governments more correctly reflects the confidence of capital than any other market department. A feature of governments was comparatively heavy selling by foreign holders, with hardly a reaction in price here. The only group which recorded a decline which was due to general conditions was that of soft coal. This industry has been on a hard-pan basis throughout the year. Soft coal roads are among the very few which are not highly prosperous. The heavy losses in Columbus & Hocking Valley bonds were in a large measure respons ible for the adverse average of the group.—[Railroad Gazette.

LITTLE PROFIT FOR EASTERN IRON MAKERS.

Hon. Abram S. Hewitt contributes the following to the New York *Times* concerning the outlook for the iron trade of the country, and particularly for Eastern plants:

"Generally speaking, the iron industry of this country is in a waiting condition. The country's capacity of production continues to exceed the demand, hence prices do not advance. Business is not stagnant. It is more active than it has been, yet because of the fact that consumption is still far behind the capacity for production there is no profit in sight. Nobody in our line of business is making any money unless some of the steel men are. But, of course, only those persons in the big steel concerns know what they are doing.

"This is an era of low prices. Everything is making for the benefit of the consumer, and this condition is by no means confined to the iron industry. The consumer everywhere is benefiting at the expense of the producer just now, except in agriculture. If we could have a short crop of iron, prices would go up, but instead of there being any prospect of a short crop of iron, new fields of production seem to be opening up continually. The fact that there is no profit in the business is not due to lack of demand for iron. The demand for that commodity is now greater than ever before. I believe that the year 1898 will show the largest production and consumption of iron that the world ever saw, but the trouble is that the production increases even more rapidly than the consumption.

"For the manufacture of crude iron in the East I can see no hope of better times. The seat of production has moved, and we of the East can no longer compete with the furnaces of the West and the South. They can make iron cheaper than we can because they are able to get their materials together at much less cost. They can manufacture iron in the South at about $6 a ton, and we cannot make it under $10 a ton. The iron ore of the West, especially that of the Lake Superior region, is better than our ore because it is purer and richer. It is more easy to smelt and produces a better article. This overwhelming competition has prostrated the ironmaking industry in the East. The great Lehigh region is ruined and our own great plant in New Jersey is useless. We have a plant which we could have sold at one time for $3,000,000, but now not a furnace is in blast. We cannot afford to start a blast furnace and I have no hope of the future so far as this branch of our business is concerned. After 50 years of successful business we have come upon a period of change. Natural conditions have operated to take the ironmaking industry to other localities. Some concerns in the East, which were wholly unprepared for this change, have been practically wiped out. In our own case, fortunately, every dollar of our plant was paid for, and we shut down in time to avoid losses in addition to value of the plant.

"Of course, we shall operate our mills and continue to manufacture wire and structural iron. All of the materal used in our manufacturing business, however, is bought in the market. We neither dig nor smelt a pound of ore."

THE TIN PLATE MARKET.

The same uninteresting condition that has characterized tin plate for the last 60 days continues. There has been more inquiry from the larger buyers, and in the East some large orders have been placed for deliveries over the first half of the year, but the general condition of the trade is one of waiting.

The meeting of the makers at Columbus did not result in any attempt to advance prices, or bring the makers together in anything like a price agreement; but a committee was appointed to take up this matter and another meeting will be held during the present month. It is generally understood that some effort will be made to bring about a price agreement or combination of some kind. The experience of a year ago leads buyers to believe that the price agreements of the Tin Plate Makers' Association are not to be feared. A year ago it was announced that prices would be advanced 50c a box; the actual result was that prices were reduced fully 25c per box.

It is possible that the agitation at this time of new price agreement is with the hope that it will be an incentive to stimulate more active buying and bring in those large consumers of Tin Plate who are now holding off and for whose business all of the mills, dealers and agents are anxiously waiting. But thus far buyers have taken little interest in it.

The average quotation of the market, f. o. b. Pittsburg or Indiana district, is as follows:

	IC	IX
CHARCOAL TINS.		
Lisvane Grade,	$3.45	$4.20
Calland Grade,	3.65	4.35
COKE TINS.		
IC, 108 lb. Basis weight,		$2.95
100 lb. " "		2.85
95 lb. " "		2.80
90 lb. " "		2.75
85 lb. " "		2.70
80 lb. " "		2.65
TERNE PLATES.		
IC, 216 lb., 20 x 28		$5.95
200 lb. "		5.65

On coke tins the prices above mentioned have been shaded from 5 to 7½ cents per box on large specifications, deliveries over the first half of the year. Spot plates are scarce, with price reasonably well maintained.

THE purchase is reported of 400 acres of coal land in Somerset and Cambria counties, Pa., by the Johnson Co.

12,457,002 TONS.

LAKE SUPERIOR IRON ORE OUTPUT IN 1897.

We present this week our annual statement of the shipments of Lake Superior iron ore, mine by mine. The total for 1897 is 12,457,002 gross tons, as compared with 9,934,446 tons in 1896 and 10,429,037 tons in 1895. This makes the 1897 output the greatest ever achieved, by more than 2,000,000 tons. There were 78 shipping mines in 1897, against 84 in 1896, 86 in 1895, and 67 in 1894:

MARQUETTE RANGE.

	Gross Tons.
Blue	2,519
Cambria	110,648
Champion	141,728
Cleveland-Cliffs Iron Co	718,408
Dexter	1,154
Jackson	79,102
Lake Angeline	489,685
Lake Superior	376,761
Lillie	112,781
Negaunee	182,169
Queen	239,774
Republic	124,342
Richards	6,887
Richmond	4,630
Rolling Mill	3,975
Star West	942
Winthrop	106,894
Total	2,702,399

MENOMINEE RANGE.

Antoine	98,847
Aragon	149,594
Chapin	643,402
Commonwealth	98,283
Columbia	24,623
Crystal Falls	95,210
Cundy	41,942
Dunn	31,062
Florence	37,594
Hemlock	96,032
Loretto	54,104
Mansfield	37,182
Mich. Explo. Co.	216
Millie	10,374
Penn Iron Mining Co.	237,886
Pewabic	279,855
Sheridan	146
Youngstown	661
Total	1,937,013

GOGEBIC RANGE

Ashland	111,625
Atlantic	50,307
Aurora	196,122
Brotherton	46,186
Cary	37,308
Colby	22,921
Germania	1,015
Iron Belt	95,727
Jack Pot	1,265
Mikado	11,397
Montreal	191,106
Newport	150,979
Norrie	604,251
Pabst	220,496
Palms	208,682
Pence	120
Shores	16,102
Sunday Lake	45,815
Tilden	276,890
Windsor	385
Total	2,258,236

VERMILION RANGE.

Chandler	438,365
Minnesota	592,196
Pioneer	207,103
Zenith	40,817
Total	1,278,481

MESABI RANGE.

Adams	175,802
Auburn	175,263
Biwabik	427,464
Cincinnati	32,912
Cloquet	12,215
Commodore	60,798
Fayal	642,939
Franklin	30,128
Genoa	309,514
Hale	13,728
Lake Superior group	259,912
Mahoning	519,892
Mountain Iron	773,538
Norman	101,077
Ohio	47,350
Oliver	601,072
Penobscot	11,933
Roberts	18,614
Sparta	66,722
Total	4,280,873

The tables below show the distribution of the year's shipments by ranges and by ports, together with the all-rail shipments. These were 241,357 tons in 1897, or about 50,000 tons less than in the preceding year, the operation of charcoal furnaces in Michigan and Wisconsin being more restricted in 1897 than in 1896. The Marquette range comes next to the Mesabi, as in 1896. The Gogebic range makes a far better showing than in 1896, the relatively small sales of Norrie ore in the latter year being followed by the marketing of about 1,000,000 tons in 1897. The new management of the Norrie and the Tilden ensures for those properties a large output this year, which will help to put the Gogebic still further up in the list:

SHIPMENTS BY RANGES.

	1896. Gross Tons.	1897. Gross Tons.
Marquette Range	2,603,839	2,702,399
Menominee Range	1,560,467	1,937,013
Gogebic Range	1,799,971	2,258,236
Vermilion Range	1,088,090	1,278,481
Mesabi Range	2,882,079	4,280,873
Total	9,934,446	12,457,002

SHIPMENTS BY PORTS AND ALL-RAIL.

	1896. Gross Tons.	1897. Gross Tons.
Escanaba	2,321,931	2,302,121
Marquette	1,564,813	1,945,519
Gladstone	220,887	341,014
Ashland	1,566,236	2,067,637
Superior	167,245	531,825
Duluth	1,988,932	2,376,064
Two Harbors	1,813,992	2,651,465
All-Rail	290,410	241,357
Total	9,934,446	12,457,002

With our issue of next week we will publish the usual annual supplement, giving the iron ore shipments from Lake Superior for 1897 and the preceding 42 years by ranges and by mines.

THE Export Iron & Steel Co., organized some months ago by the manufacturers of hoops, bands and cotton ties in Pittsburg and other districts, has been making good headway in its foreign campaign. Recent shipments of 300 tons of material into new markets are reported, in several cases German and English products being displaced. F. L. Clark, treasurer and manager of the exporting company, who is president of the Wm. Clark Sons Co., reports excellent prospects in foreign markets. "All the trade," he says, "was formerly handled by the British, but now the New York agents have taken up the matter and are securing a good business for us. India is the principal foreign market."

FOUNDRYMEN'S ASSOCIATION.

The regular monthly meeting of the Foundrymen's Association was held at the Manufacturer's Club, Philadelphia, on Wednesday evening, Jan. 5, with President P. D. Wanner in the chair. There was no report from the executive committee.

Secretary Evans, according to the custom that has prevailed at the meetings recently, called on those present to report upon the condition of trade in their various branches.

Mr. Thompson said: "We are not busy, but the past two months have been fair. The volume of business is good, but the prices are low, and the outlook is not encouraging."

Mr. Messick: "We are busier than we have been for a number of years. All our works are in full blast. Last year our business was altogether foreign. This year we are enjoying considerable domestic trade and a little foreign business. We have just introduced our paper machinery into Europe, where it is being enthusiastically received. We placed an order in Finland which revolutionized things there. Our machinery is also going into England, France and Germany, and we now have forces of men there."

W. H. Pfaehler: "I am surprised to hear so many gentlemen complain that prices are not satisfactory. That in itself seems to me a sign of prosperity. The march of prosperity is along the line of lower prices. Nowadays the man with money to lend is forced to accept lower interest; the farmer is compelled to dispose of his product at lower rates, and so it goes. Between the cost of a manufactured article and the price of that article deposited in a bank, there will be shown a large profit, if the manufacturer can afford to lop off all unnecessary expenses."

Mr. Belfield: "I agree with Mr. Pfaehler. We have adopted new methods to meet the new conditions, and we are making a profit. Instead of waiting for better prices, which may not come, we are pushing every opportunity that comes to us."

Mr. Devlin: "Affairs in our branch, the malleable iron branch, are not rosy. We have more business, but at lower prices than ever before."

Mr. Green: "In the crucible industry there are better prospects, but very low prices. However, money is coming in promptly and that's something."

President Wanner: "One thought has occurred to me that might bear dwelling upon. I have always regarded Mr. Pfaehler as a very bold man, a very daring, but thoughtful man. There is one thing in what he says that challenges consideration. That is the labor question. When we realize that 90 per cent of all that enters into the cost of our products is labor, we must take it seriously into consideration. If we can convince labor that lower prices must prevail, then we are all right for the future. But if that is not believed, then there will be trouble. Such trouble would throw us back further than before. If you believe low prices to be inevitable, then go ahead. We are ahead of any country in the world in our manufactures, but there are certain conditions we must meet manfully."

Mr. Geo. C. Davis, chemist of Thomas Devlin & Co., then read a paper on "The Annealing of Malleable Cast Iron." It is as follows:

Annealing of Malleable Cast Iron.

The writer had the pleasure in May last of reading before this association a short article on "Malleable Cast Iron," with special reference to the chemical specifications. The most characteristic part of the process, the annealing, has not until very recently been at all understood. It was generally known that the carbon of the casting was oxidized by the oxygen of the packing, since the carbonic oxide could be seen burning at cracks in the luting during certain stages of the process, and further than that, analysis showed that part of the carbon had been removed. Several writers on metallurgy treat this subject in a very noncommittal way, saying that the oxygen of the air oxydized the carbon—a statement true enough where annealing in sand or like substances was the method described; but these writers carefully refrained from explaining how it was done in the Reaumer process. For if the air were the source of oxygen, we should hardly expect to find the packing reduced nearly to the metallic state, as it is in some cases. One writer in a book published in this city in 1872, advanced the idea that the dissociation of the carbonic acid contained in the gases of combustion was the true explanation, though his assertion was unsupported by any evidence. This view was at least plausible. Then the second difficulty was how the carbon in a solid body could combine with the oxygen of the packing (a very stable substance not dissociated by heat), as it evidently did. The carbon from the casting for an eighth of an inch or more had united with the oxygen of the enclosed packing, but how the two got together was an unsolved problem.

It remained for an English metallurgist to show that the process was one of diffusion. Thus, if two bars of steel, one high carbon and one low carbon, are heated in contact with each other to a temperature of about 900 degrees C., the carbon diffuses gradually from the one to the other. This experiment was conducted in a porcelain tube in vacuo. And it is a similar diffusion that brings the carbon of the casting into contact with the oxygen of the packing. At the meeting of the British Iron and Steel Institute held in May of last year, there was presented by Mr. G. P. Royston a paper on "Malleable Cast Iron," which with the discussion that followed has doubtless been read with great interest by makers of malleable castings in this country. This paper, so far as it presents what we may call the practical details of the process, brings out certain marked differences between British and American practice, so comment from the latter point of view may be of interest. Both Royston and Hadfield take the ground that manganese in appreciable amounts is injurious. The pig iron used in the experiments contained .112 per cent and the casting .043 per cent manganese, thus showing more than the usual loss in melting. I have never found any good casting that was made in this country that ran as low as this; even those made from charcoal iron exclusively. The average analyses of three typical brands of charcoal iron for the past year show for the No. 2 grade .24, .32 and .45 per cent respectively, and for the No. 4 grade of the same brands, .19, .14, .18 per cent. The leading brands of coke malleable run still higher in this element. One contains from .60 to 1.00, another .60, and a third well known brand from .20 to .50.

A few concerns use small quantities of pig containing three per cent manganese, but this is with a view to producing a smooth and solid casting free from pin holes. We see from these figures that it is impracticable with the pig at our disposal to produce castings as low in manganese as is held to be absolutely essential by the British writers, even were this result desirable. And I do not think that it is. In this country the most common practice is to make a mixture containing from .40 to .80 per cent manganese, which would give from .20 to .40 per cent in the castings. Whatever reason there may be for claiming that castings containing manganese anneal with difficulty, since carbide of manganese and iron is more difficult to decompose than carbide of iron, the fact remains that according to the writer's experience in actual practice castings of the composition mentioned above are annealed without the slightest trouble. The combined carbon is below .10 and frequently only traces; the graphite of course depends on the cross section of the casting and time of annealing.

A number of tests and analyses by a Western concern show .75 per cent to .98 per cent; manganese .35 per cent to .53 per cent; tensile strength, 39,600 to 53,700; elongation, 3.85 per cent to 7 83 per cent. Unfortunately the carbons are not given, but it is obvious that to obtain these results the annealing must have been good. Sulphur, if present in large amounts, interferes with annealing, as was shown in a paper by H. R. Stanford, read before the American Society of Civil Engineers, in 1895. In melting iron in an air furnace, using a coal containing 1.12 per cent sulphur, I found the metal gained not over .03, so the casting never ran over .06. Some castings are made from iron melted in a cupola and here it occasionally happens, from bad fuel or irregular melting of the sprues in the charge, that the sulphur will run too high. In a previous paper I referred to an extremely tough casting containing .120 per cent sulphur. This casting was about one-eighth inch thick and had the carbon practically all removed. In the case of a thicker casting, where the annealing did not remove all the carbon, I found a slightly larger amount of sulphur sufficient to prevent complete annealing. A casting ⅜-inch thick, after once annealing, showed sulphur .133; graphite, .547; combined carbon, .515. After a second

annealing the graphite was .505 and combined carbon .380. Using the best fuel obtainable and the greatest care in charging, it is possible to melt iron in a cupola without adding more than .03 per cent sulphur, but I find that few works can show as good results as this, and more often .06 or over is added than the former figure. West Virginia coke, running from .50 to .65 per cent sulphur, and Connellsville at about .85, can be easily obtained, so it is entirely practicable to produce castings from cupola metal running below .10 per cent sulphur, an amount not objectionable in the class of castings made from this iron.

The difference between Reaumur's process where the carbon is wholly or partially removed and the process described by Forquignon, where it is simply changed to graphite, or decarburized and transcarburized respectively (as one author puts it), are fully brought out in the discussion of Mr. Royston's paper.

Many manufacturers of malleable iron in this country do not understand this matter. Some of them use various processes for annealing which do not decarburize to any appreciable extent, under the impression that they are producing Reaumur castings. A number of processes for the production of malleable castings have been proposed by men ignorant of the rationale of the Reaumur process. It is impossible for commercial reasons to discuss them here. Suffice it to say they are no improvement and many are obvious frauds, such as the addition of mysterious "fluxes" in the furnace, or ladle just before pouring. In the discussion, Mr. Hadfield takes issue with Mr. Royston, who says no bend can be obtained if the graphite is present, as in the so-called black heart castings, such as are produced by annealing in sand or bone ash in luted pots. Mr. Hadfield instances a casting made in this country containing 3 07 per cent graphite, which could be bent in a manner approaching soft steel and had a wonderfully good resistance of sudden blows. My own experience agrees in the main with Mr. Royston. While castings containing large amounts of graphite will sometimes bend well, I never found them as tough as decarburized castings containing equal amounts of the other weakening elements, silicon and phosphorus.

In this country roll scale is used as a packing in preference to ore for several reasons. Ore sufficiently low in silica would be more expensive for works located east of the Alleghenies. Mill scale requires no grinding or other preparation than to oxidize (or "rust", it as the common saying is) with a weak solution of sal ammoniac. Instead of mixing three or four parts of spent ore with one of raw ore ground to the size of a pea, as described by Mr. Royston, it is the common practice to spread the spent packing on the floor and sprinkle it with a weak solution of sal ammoniac so the mass becomes oxidized. This spent packing is of course finally divided, as it falls through the crevices in the tumblers where the whole charge is placed. The oxidized mill scale is added from time to time, as there is always some loss in handling the packing, from dust and in other ways. So far as the pots are concerned no special mixture is made for them. They are cast from cupola metal, if this is available, and last five or six heats, depending on their position in the furnace. A number of types of annealing furnaces are used. Probably in the most efficient type the fire is built in furnaces along one side, the gases entering near the top, passing across the furnace down the opposite side and out the ports to by-pass flues underneath the floor and finally to the stack. Thus all sides of the furnace are heated to a nearly uniform temperature.

Mr. Royston refers to the question of scaly castings without covering the whole ground. In speaking of annealing in sand or bone ash he says: "The reaction taking place between the carbon and the iron should be C and O—C O. Should it be C and O_2—C O_2. The iron will also be oxidized by the carbonic acid and the casting will be scaled." To put it in other words: If you use too much air you will burn the castings. Continuing, the author says: "Where oxides of iron are used as a source of oxygen, the carbon monoxide partially reduces the iron of the oxide to the metallic state." This sentence is of doubtful meaning, but I take it he intended to say, "Reduces the iron of the scale to the metallic state." It frequently happens that where a number of small castings are annealed in ferric oxide in the same pot, some will scale and some will not. I have never found a scaly casting that contained the amount of manganese usual in good castings and I believe that this element acts to prevent scaling; at least, when annealing in ferric oxide. Thus in one case a scaly casting showed .08 and a good casting .27 per cent manganese, both being annealed at the same time. With regard to phosphorus, if the Lorn pig used in Mr. Royston's experiment is one of their representative brands, the English founders seem to be running lower in this element than is necessary. I certainly do not believe in adding phosphorus *ad libitum*, but in this country the usual specification is .20 or less, and certain it is that castings containing .18,—that is a fair average figure, I think,—show excellent results.

Henry S. Robbins, of the Clement Pneumatic Tool Co., Philadelphia, followed with a paper on "Improved Pneumatic Tools for Foundry Use." We give it below:

Improved Pneumatic Tools for Foundry Use.

The use of pneumatic tools for cleaning and chipping castings is not new. However, certain defects in the old style of construction, the want of knowledge of their operation, together with the prejudices of ignorant workmen, have resulted in eight cases out of 10 in the condemnation of the tools for foundry use. With your kind attention, I shall endeavor to show that the up-to-date pneumatic tool has none of the objectionable features that were so prominent in the earlier or cruder forms of them; also to indicate the part that has been played by both ignorance and prejudice in the testing of these tools. In fact, I shall try to show how pneumatic tools should be introduced and used in your business so that they will save you money.

The first thing we will deal with will be the objectionable features of the old style of tools, of which there coil or "kick" was the most noticeable. This recoil has done more to prevent the adoption of large sized pneumatic tools than anything else, as it has enabled the workman afraid of losing his place to say with some appearance of truth that holding the tool was injurious to him, producing a paralysis of his arm, etc. To this let me reply that I know of men who have been running pneumatic tools continuously for the past five years, and who have not been affected in the slightest by them in any way. This drawback, however, can be demonstrated to be a matter of the past, and my purpose is only with the present. It affords me much pleasure to say to you that the improved Clement valveless tool is so constructed and so evenly balanced that all "kick" has been eliminated from it. It has an air cushion so placed that when in operation the workman is really pushing against air, the elasticity of which takes up all shock and vibration.

Another important objection that is made to the old style pneumatic tool is in the many small parts, valves, springs, etc., that enter into its construction. Such a number and variety of parts makes the tool very delicate, and liable to get out of order; because should any one of these valves or springs stop acting or fail to do its work at just the proper time, it would stop the whole tool. For, as every one knows, in a tool of such construction successful operation is dependent upon the proper-timed action of its smallest moving part.

The improved Clement valveless tool which I show you here is a marvel in its simplicity. It consists of but three parts, or pieces, a cylinder, that is bored out of a solid piece of steel; a hammer, or piston made of tool steel; and a butt piece, or plug, to close the end of the cylinder. The only part of it that moves is the hammer, and that is not dependent on the movement of any other part for its own motion. No slight or ordinary cause can prevent this tool from operating. In fact, if it is given fair treatment, and regularly oiled, it can be depended on for a long period of steady and reliable service, and this warrants the manufacturer in guaranteeing it against all repairs for two years. This, I trust, shows plainly and conclusively to any investigator, that the objectionable features in the pneumatic tool of the past are not to be found in the improved tool of to-day.

No doubt, some of you have had pneumatic tools tested in your foundries, and perhaps unsuccessfully. Have you, however, considered in such a case how this test was made? Was it done in an intelligent manner? Did the person supervising the test know anything about the use of pneumatic tools, or did he know which size tool to use for certain work; or, was it rather considered, as is often through ignorance the case, that any size tool would do for any kind of work?

Pneumatic tools, you must know, are made in many sizes, and to use them to advantage you must use them for the purpose to which they are adapted—that is, a small tool for light work, and a large tool for heavy work,—on the same principle that you now use, as circumstances require, a one-pound hammer or a 10-pound sledge. Then again, at what air pressure did you try this tool? Do you know whether the pressure used was high enough to develop the efficiency of the tool? And last, but not least, in whose hands was the tool placed for trial? Was he a man who would work for your interests, forgetting his own, or was he opposed to the tool, because it was a labor saving device, and because its adoption was liable to bring about the discharge from employment of himself, or some of his shopmates? These are all important considerations, and may explain to you why the test of pneumatic tools in your shop was a failure, if such it was.

The best way to introduce the tools is to place them in the hands of young men, who are, as a rule, ambitious and who will take a pride in running a new machine. Let them know that the successful operation of the tool will mean a slight advance in their wages; and thus stimulate them to further your interests by trying to better their own. On the contrary, if you give the tools to a man who believes only in old hand methods, and the amount of work that he will turn out will be small, comparatively speaking. The average amount of work that can be done with these tools is as follows:

In removing sand from large and heavy castings, one man with a medium sized tool, and a broad chisel, can readily do as much work in a given time as six men could do by hand methods.

One man with a tool can do as much light fin-chipping as is usually done by five men in the same period of time; and when it comes to rough or heavy chipping, one man with the proper sized tool can do about the same quantity of work that is generally done by three or four men with the hammer and chisel.

It is sometimes necessary to do chipping to a line, or true surface. A man who is skilled enough to do this class of work with a hammer and chisel, can accomplish just twice as much in the same time by using a pneumatic tool for the purpose. The operator has absolute control over the tools used for this fine work; striking a light or heavy blow, as he desires; governing the force of the blows by the simple pressure of his hand, and not by throttle valves, etc., that are so liable to wear out.

If anyone should doubt the possibility of the operator being able to cut to a line, or having this perfect control over the tool, it affords me pleasure to refer you to the marble and granite cutter, who not only does the most delicate carving and lettering with the tools, but does it on a substance that is vastly more friable and brittle than cast iron.

Before concluding, I ought perhaps to say a few words about air plants when used in connection with pneumatic tools. In the first place, an air compressor, an air receiver, and a lot of different sizes of pipe strung around a shop, do not always constitute either an efficient or economical air plant. To get the best results, you require:

First. An air compressor of approved pattern, of sufficient size and power to develop and maintain a steady pressure of 80 to 100 pounds to the square inch.

Second. An air receiver of sufficient size to equalize the pulsations of the compressor and to cause the air to flow with uniform velocity to the tools.

Third. As air in its passage through pipes is subject to friction, in the same manner as water, it is important that your pipe system be carefully designed, as loss by friction may be quite serious. In calculating such loss, it would be well to remember that the difference in pressure between the entrance to the pipe and the point of use, termed in hydraulics "loss of head and power lost," is not applicable to compressed air. Compressed air will lose 10 per cent of its head, but the loss of power will only be about three per cent. The reason for this is simple, when you remember that compressed air as it loses in pressure gains in bulk, and thus in a measure by its increased volume compensates for the diminished pressure.

A brief discussion followed the reading of Mr. Robbins' paper. Mr. Evans asked: "What amount of power is required to operate your pneumatic tools, and what is the saving over hand work?"

Mr. Robbins: "A belt compressor, to operate three 14-ounce tools, which are the medium size, would require 4 horse power."

Mr. Evans: "What would be the cost of the compressor?"

Mr. Robbins: "Well, the compressor would cost $180; the receiver $40; pipe to carry 100 feet, $5; three tools $300. Total, $525, exclusive of belting and fuel." Mr. Robbins added that the tools were used in Cramps shipyard for caulking and for chipping castings. A 14-ounce tool, he said, would use 10 cubic feet a minute at 80 pounds.

A vote of thanks was extended to Messrs. Davis and Robbins for their papers, and the meeting adjourned.

Chicago Iron-Working Industries in 1897.

In its annual review of the markets for 1897, the Chicago *Tribune* gives the following tables of money and labor employed, and product, of some of Chicago's leading industries using iron and steel in various forms:

IRON AND STEEL.

Industries.	No.	Capital.	Workers.	Product.
Rolling mills	6	$22,000,000	3,100	$17,250,000
Foundries	70	13,000,000	3,950	16,000,000
Machinery, malleable iron, etc.	80	6,350,000	3,000	12,000,000
Boiler works	28	700,000	450	1,500,000
Car wheel works	6	3,000,000	1,600	3,500,000
Stoves and furnaces	10	600,000	350	750,000
Steam fitting and heating	22	1,250,000	1,050	3,000,000
Galvanized iron, tin, and roofing	75	800,000	1,150	2,100,000
Barbed wire and wire works	10	400,000	300	750,000
Miscellaneous	60	4,250,000	3,400	8,000,000
Totals	367	$54,650,000	18,650	$65,050,000
Totals for 1896	367	52,250,000	16,975	54,275,000

The amount of wages paid approximated $10,400,000, against $9,500,000 in 1896.

IRON AND WOOD.

Industries.	No.	Capital.	Workers.	Product.
Wagons and carriages	45	$2,700,000	1,500	$ 3,100,000
Agricultural implements	6	8,500,000	6,500	20,775,000
Car and bridge builders	5	5,875,000	4,250	13,000,000
Elevators	6	1,750,000	700	1,750,000
Miscellaneous	4	625,000	325	600,000
Totals	66	$19,450,000	13,275	$39,225,000
Totals for 1896	66	19,450,000	13,075	34,000,000

The wages of the year were estimated at $12,150,000, compared with $10,525,000 the previous year.

JOHN A. WALKER, vice-president of the Joseph Dixon Crucible Co., Jersey City, N. J., writes as follows concerning the business of 1897: "In 1893 it was a case of business paralysis, in 1894 we had a year of debility, in 1895 the patient partially revived, in 1896 came a relapse, but in 1897 came recovery and the patient took up his bed and walked. The great medicine man was dollar wheat and 30 cent corn, plus poor harvests at this exigency abroad. I saw it myself, for in November, I visited Indianapolis, Cincinnati, Chicago, Omaha, Denver, Kansas City, Pueblo and St. Louis, and saw every one up to his eyes in new business. The consumer at last had money once more, and was spending it. The industrial triumphs of 1897 are important. In this year the business cloud passed away and another era of prosperity, hopefully of long duration, opened. Export trade was larger in the fruits of the harvest, and particularly in manufactured goods, than in the history of the country. Americans are competing in every market. American motors won the order in London. On a bridge in Holland an American firm was the lowest bidder. American steel rails go regularly to China, Japan and India. A movement is on foot to have the English parliament pass a law changing the stamp on goods not made in England, stamped 'Abroad' instead of the name of the country where they are made. This is an effort on the part of the English law-makers to obscure the origin of these goods. For the Dixon Co., personally, we have shared in the general prosperity. The year has been an agreeable one, the future looks rosy to those who have eyes to see. Perhaps the outlook was never more inviting. Never were there so many roads open to wealth to those who know how to find them."

THE contract for the low pressure pumping engines for the new Cincinnati water works has been let to the Lane & Bodley Co., of Cincinnati, after sharp competition. The price is close to $500,000. Local labor will be employed exclusively on the work.

AMERICAN MACHINE TOOLS IN ENGLAND.

We make some extracts below from the article in London *Engineering*, by Joseph Horner, of Bath, Eng., on "Some Lessons of the Stanley Show," and the prominence of American exhibits there:

"Of course, one cannot suppose that American engineers and mechanics are more richly endowed with mechanical genius and skill than ourselves. But other qualifications than these are essential to success in a time like the present, when England is but one section of the world's workshop. Such qualities as these are of equal value, and under similar conditions of mechanical skill will turn the scale. One of these qualifications is to study the precise wants of users of machinery and tools, and to cater for those wants as carefully as possible, unhindered by preconceived ideas and conservative prejudices. This method involves not only questions of general design, but also the working out of an almost infinite number of minute details, including accessories, feeds, movements, both for saving time and conducing to efficiency of results; details which have their highest development now in the numerous automatic machines which do everything but talk, and which are at once expeditious, accurate and self-attending.

"The second condition is that the thought of finality must give place to that of progress. There is no machine which is so good but that it may be improved upon. If any real improvement is seen to be possible, then drawings, patterns, stamps and special tools must be altered or re-made, so that the best possible results are secured thereby.

"The more highly developed, the more complicated a machine becomes, the more perfect must its workmanship be. This involves the design of the most perfect machine tools and small tools for the production of this perfect work. And inasmuch as this is only possible financially by the sale of a large number of machines, it further includes the adoption of a perfect shop system, or that under which interchangeability of parts is secured, while the actual cost of labor on any single piece is almost infinitesimal—a fraction of a penny in some cases, in others a few pence or cents only.

"In these main reasons, with all that is involved in them, is to be sought the cause of the practical monopoly by the Americans of the cycle-making machinery. In these cardinal matters English methods and American methods differ substantially. We are conservative in method; they are alert and progressive. We tread in time-worn grooves, they seek more excellent ways. We do not adopt the interchangeable system to the same extent as they do. American shops are becoming increasingly specialized, and to a much greater extent than the English ones. There are few firms in America like Messrs. Tangye's, for example, in England, who manufacture machine tools, cranes, engines, pumps, boilers and many other articles. The number of those who are engaged in the general machine tool trade, like Messrs. William Sellers & Co., is not large. Many of the firms confine their attention chiefly to a few types of tools only. One need only mention Messrs. Warner & Swasey, for brass finisher's tools, the Gisholt Co., for specially heavy turret lathes, the Jones & Lamson Co. for another class of turret lathes, the Pratt & Whitney Co., for lathes and screwing machinery and measuring instruments, among many others. The consequence is that there is no finality in design thought of. Improvements are being constantly introduced, and the special machines, the products of particular firms, become as well known by name and number as the Whitworth threads or the Morse tapers.

"Special types of lathes, of which English makes were either absent or poorly represented, were the screw machines with turrets for turning and boring hubs and cups, for facing sprockets, and doing other work of a cognate kind. It seems that to shape hubs with broad forming tools operating back and front, to screw threads with opening dies, to turn and bore sprockets, to mill edges from the turret, besides much else, one must get American tools. No English machines were performing these operations at the show. The quantity of material removed in a few minutes by forming tools in turning hubs from the solid bar would have been pronounced impossible by any workman a half dozen years ago. But there remains the fact, nevertheless, that the hubs can be turned more cheaply thus than by using drop forgings in which the amount to be removed by turning is slight. So with the recesses in the sprocket wheels; these are perfectly interchangeable, because they are turned by nests of tools arranged somewhat similar to the tools in a boring head.

"In all these machines the bearings are so massive that any sensible wear is practically impossible. The slides are long, and scraped to accurate fits. All is substantial and stable, even though the work done is often of small size.

"There was a goodly collection of light lathes at the Stanley show. A few were English, most were American. The former did not appear to advantage by the side of the latter. The American lathe has come here to stay. On the whole, it is a good machine; in several respects it is much handier than the English standard type. I am not speaking of the American lathe of 12 or 15 years ago, but of the machine as it exists to-day. Of these there was a goodly selection, varying widely in design and in detail. Using a very old simile, the English might be likened to the great Spanish galleon, the American to the light English vessels. There are many little details about modern American lathes which may tend to facilitate the work of the turner and screw cutter, while the English lathes are made much as they were 30 years ago. To go into points of detail would occupy too much space, and they are more or less familiar to most users of machine tools.

"Not only in design, but in matters of detail of fitting and finish, the American lathes were superior to most of the standard types of English ones at the show. That does not say that they were superior to the best English machines, but then none of the best English firms were represented there. But if they had been, the American fitting would still have compared favorably with theirs. . . . . The best English lathes were those which are made by firms who build in greater or less degree upon American design, and after American methods. The fact that several such firms have grown up in recent years illustrates the adage that 'imitation is the sincerest flattery.'

"In making comparisons at the show, one notices the incompleteness of some of the English tools by comparison with those of American design. This is observable in the friction-geared heads, in the wire feeds, in turret arrangements, in the lubricating apparatus, in stops, in the steadying and centering jigs, by the use of which eccentricity of turned and screwed parts is rendered impossible. The feeding of a flood of lubricant under pressure through the turret center along oil-tubed drills directly to the cutting point is a nearly recent feature to fitted American turrets. The quantity of lubricant used, mostly expensive lard-oil, would frighten an old-time believer in the drip-can; but then, with tank-beds and trays and a centrifugal separator, the oil is almost wholly recovered and used again and again. The constant flood of lubrication also permits of heavy cutting, while the tool edges are preserved for a long period intact. The use of the turret is not confined so closely to the holding of single drills, reamers and cognate tools as it is with us. Box tools predominate, and these are so constructed that work is easily turned to thousandths of an inch, with true cutting tools, ground and set to correct angles. Though tools of this type are used in English shops, they have not reached so high a degree of development, and such infinite variations, as those sent from America. Exceptions occur in those English shops which are modelled on American lines and methods, such, for example, as the Small Arms Factory, at Enfield Lock. And it is easy to see why the tools endure so long without regrinding; the rate of turning is not rapid, but there is no time lost, on the one hand, nor tools unduly forced by the introduction of the human element, and the lubrication is most abundant.

"Sufficient has been said to indicate one direction in which English manufacturers have permitted the invasion of foreign machinery in large quantities, and even the English manufacturers go to the American agents for their small tools. At Churchill's I was shown £2,000 worth of American twist drills on shelves. Micrometers, calipers, milling cutters, reamers and all kinds of small tools for working metal and wood were also closely packed in ranges of shelving. There are six agents for American machinery in London alone, besides others in the provinces; and large numbers of machines are ready for immediate delivery. If a machine does not

happen to be in stock, it can generally be delivered from America in from three weeks to a month. As regards prices of the ordinary machines, as a general statement, the best American machines cost more than those made by second-rate English firms, but less than those of the best Manchester firms. In reference to design and workmanship, the tools of the best American firms leave nothing to be desired. The Americans have made a point of catering for the English and Continental tool users, and their excellent systems of measurement and templet work enable them to make parts interchangeable.

"Much more relating to the subject suggests itself to the mind, but this must suffice. These lessons of the show should be laid to heart by the great English firms, rich in capital, in prestige, in skill. In other directions there are not wanting indications that English manufacturers will be hard pressed in the near future. But one lesson is enough to learn at one time."

AN ORDER FROM RUSSIA.

Some facts of interest are furnished by the Shultz Belting Co., of St. Louis, concerning an order recently received by it

FIG. 4.—RUSSIAN ORDER FOR AMERICAN PRODUCT.

from Russia. The order itself and the legal tender given by the purchaser is shown in fac-simile herewith. It was received by President J. A. J. Shultz on Dec. 10. As will be gathered from Fig. 2 of the cuts, the order was for 10 pounds of the Shultz belting cement. The 10 roubles sent in payment is equivalent to $4.70 in the currency of the United States, but the money was sent by express and cost the recipient $2.10 in express charges—a feature of the transaction that leaves a lively impression of the Russian method of doing business. However, the recognition from so distant a source, of the merits of the Shultz Co.'s product was gratifying, and may be regarded as a result of the company's liberal advertising policy. In Fig. 1 is reproduced the face of the envelope, with its peculiar endorsements. Fig. 3 is the address of the customer, written out with all due elaboration. Fig. 4 is a reproduction of the 10-rouble note.

W. H. BOSWORTH, Perry-Payne Bldg., Cleveland, has added to his business the agency for the Kelly & Jones Co., of Pittsburg, manufacturer of plumbing, gas, steam and oil well supplies.

The Tennessee Co. and Pig Iron Analysis.

TO THE EDITOR:

In your last issue we see an article contributed by Dr. Moldenke, who quotes from an address made by Herr Schroedter, the secretary of the Society of German Ironmasters and the editor of *Stahl und Eisen*, who reports that on account of the hard times, this company had discharged its laboratory force to save expenses, and that analyses were no longer made. We are at a loss to understand how such a silly report should have originated; and although we have seen it several times

FIG. 1.

FIG. 2.

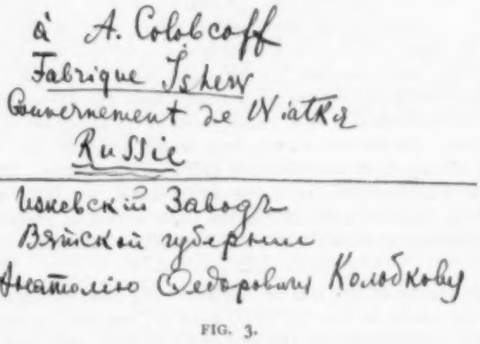


FIG. 3.

in quarters which ought to have been better informed, we have not heretofore taken the trouble of contradicting it. It is, however, hardly necessary, we think, for us to say that our laboratories are being conducted now as heretofore, and the analyses of our basic iron shipped either to the North or to Europe are being made by precisely the same chemists as heretofore.

J. BAWRON,
Vice-president Tennessee Coal, Iron & Railroad Co.

DIETZ, SCHUMACHER & BOYE, of Cincinnati, expect to occupy, about Feb. 1, their new building, which is 180 x 90 feet, corner of Queen City ave. and Buck st., Cincinnati. The firm is well occupied with orders and the increase of its business has compelled the provision of larger quarters.

IMITATIONS OF MAGNOLIA METAL.

The Magnolia Metal Co. has had in the last two or three years numerous suits with firms infringing its trade marks and patents. An injunction was granted on December 15, 1897, by Lord Chief Justice Russell in the Queen's Bench Division of the High Court of Justice, London, Eng., restraining the Tandem Smelting Syndicate, Ltd., from passing off metal for Magnolia metal. A few months ago the Globe Engineering Co., Ltd., of Manchester, shipped a quantity of metal to a firm in South Africa, that had ordered Magnolia metal. The metal sent was made up into ingots, imitating as nearly as possible the ingots of Magnolia anti-friction metal. They bore the words "Magnolia Anti-Friction Metal," but the trade-mark, the magnolia flower, and the words "Patented June 3, 1890" were not imprinted upon them. The purchaser brought an action in the High Court of Justice, at the Manchester Assizes, against the sellers, and judgment was given in his favor by the arbitrator to whom the matter was referred.

The Magnolia Metal Co. again warns the public against fraudulent imitations. Genuine Magnolia anti-friction metal is made up into bars of which the following is a fac-simile:

The trade-mark, which is also shown herewith, and the name are always stamped on bars and boxes. Besides this the words "Patented June 3, 1890" and "Manufactured in U. S." are stamped on the under side of each bar. The magnolia flower trade-mark is registered in every civilized country in the world.

The Magnolia Metal Co., of 266 West street, New York, reports that similar frauds are being committed in this country at this time, and it offers $1,000 reward to any one causing the arrest and conviction of any individual or firm infringing its trade-marks or patents.

THE 19th annual meeting and dinner of the Western Society of Engineers was held at the Technical Club, Chicago, on the evening of Jan. 3. The election of officers for the ensuing years resulted as follows: President, Alfred Noble; secretary, Nelson Litten; treasurer, C. M. Melched; first vice-president, J. J. Reynolds; second vice-president, A. V. Powell. T. T. Johnson, the retiring president, in the course of his remarks alluded to the Manchester ship canal project. He said the reason it had been pronounced a failure was because it had not been handled by the right kind of people. The improvements on account of the canal had far exceeded the cost of the work and as a consequence it could not be termed a failure. On the same lines deep water ways to the ocean were worthy of all consideration and commendation. The increase in shipbuilding on Lake Erie alone, he held, would cover the amount expended in the construction of deep water communication from the inland lakes to the Atlantic.

THE stocks of pig iron in American Pig Iron Storage Warrant Co. yards on Dec. 31, 1897, were 275,800 tons, 15,700 tons having been added in the preceding 11 days and none withdrawn. At the close of 1896 the stocks in yard were 200,700 tons; on Dec. 31, 1895, 106,200, and on Dec. 31, 1894, 111,200 tons.

D. L. COBB, Chicago agent of the Sloss Iron & Steel Co., of Birmingham, Ala., is sending out a very neat and useful paper cutter made from Sloss pig iron. Enclosed in the same box is a pamphlet descriptive of the Sloss company's properties and output.

THE suit of the Carnegie Steel Co., Ltd., vs. the Cambria Iron Co. for infringing on one of the metal mixing patents of the late Capt. W. R. Jones is being argued in the United States Circuit Court in Pittsburg this week.

BRITISH IRON TRADE IN 1897.

We publish this week a series of reports on the condition of the iron and steel industries during the past year and their prospects in the immediate future. On the whole, the retrospect is not unsatisfactory, while the outlook, except for the shadow cast by the engineering dispute, has seldom been more promising. The production of coal and iron has been largely in excess of that of any previous year. The output of steel has been almost phenomenally large, especially of the open-hearth variety, and that, too, despite a notable decline in the shipbuilding work done during the year. It might readily be supposed that this special expansion was largely countervailed by a corresponding decline in the output of malleable iron, but such does not appear to have been the case.

On the contrary, the output of puddled iron, so far as can at this date be ascertained, has been larger than that of either of the two preceding years. This is certainly true of the trade in both Scotland and the North of England, and it is likely to prove equally true of the Midlands, including Staffordshire. There is still, of course, a considerable output of puddled iron in this country despite the remarkable progress which has been made by the steel manufacture. The total output of the puddling forges of the country as a whole is likely to have been not less than a million and a quarter tons in 1897. Whether steel will ultimately entirely displace this output remains to be seen.

Probably as much is now known of the comparative merits and demerits, advantages and disadvantages, endurance and want of endurance, of the two structural materials as is necessary to enable consumers to form a judgment on what is best suited for each special purpose; and the fact that so many stick to the older metal may be taken as an indication that it has still a considerable career before it. Nevertheless, the low prices at which steel can now be produced compel such a correspondingly low range of values in the puddled iron industry that the business, as a rule, is a poor one; and when to the fact of lean profits we add its uncertain future, and the difficulties attendant upon handling the workmen, it is not a matter for surprise that many firms have shown some precipitancy in trying to be off with the old and on with the new.

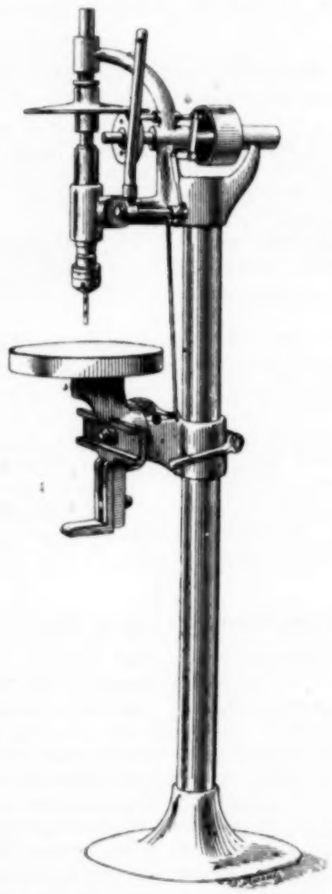
A considerable amount of capital has been expended during the past year in bringing our leading mills, forges, steel and engineering works into line with modern progress. Probably there has seldom been a year in which more solid advances have been made in this direction. Most of the leading steel works have either already acquired, or have made arrangements for acquiring, mills of the latest and most economical design. Blast-furnace owners, again, have arranged in many cases to provide increased blowing power and a higher temperature of blast, which will probably result within the next year or two in largely raising the average annual ouput of our smelting works. It is now admitted on all hands that there has been room for this improvement, and although a recognition of the fact has been somewhat tardily made, we may depend upon its leading to many important changes, now that it has really come about.

Plate-makers, in particular, are engaged in a wholesome, if for the time being somewhat costly, rivalry with one another in providing plant and machinery that can produce economically and on a large scale, so that we are likely before long to see a further cheapening of the cost of ship plates and angles, if that should be called for by the exigencies of foreign competition; but all that the manufacturer can do is subject to control by the owners of the minerals, and it is to be hoped that the threatened danger of higher prices in this direction may be overcome by bringing into play larger sources of supply.—[Iron and Coal Trades Review.

IMPROVED SENSITIVE DRILL.

An improved sensitive drill has been patented and is manufactured by the W. W. Flickinger Iron Works, of Cochranton, Pa. The accompanying cut, with a few details of description, will indicate its construction and its service. It drills holes up to $\frac{5}{16}$-inch diameter. The distance from the column to the center of the spindle is 8 inches; greatest distance from the spindle to the table, 30 inches. Traverse of spindle, 2¾ inches; diameter of spindle, ¾ inch. The table has a diameter of 11½ inches, and the driving pulley is 5 inches in diameter, with 2 inch face. The total height of the machine is 66 inches and its weight 240 lbs. A gang of these drills can be belted from a single counter-shaft, using quarter-turn belts.

The feed lever operates the whole machine, including starting, stopping, increasing and diminishing the speed, and feeding. When the lever is pulled in the direction of feeding the spindle starts automatically. When it is raised to its standing position the spindle stops automatically, so the drill only runs when in use. The lever is simply moved to the right or to the left to increase or diminish the speed, which can be done at any time when drilling. The drill is provided with a turret table composed of a spider swiveled vertically on the platen arm, with four arms on which to place the different tables, chucks or jigs to hold the work. This is useful for duplicate work. The turret can be instantly revolved from one arm to another by pressing the stop. Rapid center drilling can be done on this drill with a combination center drill and reamer, as the speed can be instantly decreased when the reamer strikes the work. All small parts are of steel, including the rack and pinion, which have ¾ inch face. The column is of cast iron. The horizontal shaft runs in babbitt metal boxes. The spindle also runs in babbitt through the quill seven inches long, with ball-bearing thrust. The upper bearing of the spindle is supported by a metal bush running in the bearing, preventing any wear on the spindle except the sliding movement. It also prevents the keyway from cutting the journal. The spindle is counterbalanced by means of a spring. The platen is also counterbalanced by a weight in the hollow column.



RECEIVED FROM THE TRADE.

The name of the Forest City Wire & Iron Co., of Cleveland, was changed on Jan. 1 to the Forest City Steel & Iron Co. In an illustrated leaflet making the announcement the company says that the new name does not mean the discontinuance of the manufacture of wire work but it is adopted to emphasize the principal products of the company, the business in the past few years having developed along the line of structural steel work. In addition to undertaking interior work—iron stairs, balconies, floor and vault lights, railings, elevator enclosures, wire guards and grilles, the company is equipped for the construction of factory and mill buildings, train sheds, power houses, roof trusses, cranes and all forms of riveted work.

A characteristic catalogue of the Hilles & Jones Co., Wilmington, Del., is Catalogue O which has just been issued. It is not, the publishers say, a general one, but presents in halftones a few of the more recent designs of this company's tools, and illustrates the scope of its operations. There are 40 photographic reproductions of punches and shears, single, combined, special and multiple, with adaptations to a wide range of work in bridge and boiler, car and locomotive works, ship yards and all works having to do with plates, bars and structural shapes. Some of these tools represent the heaviest machines made for these classes of work.

The Hazelton Boiler Co., New York, call their new catalogue "The Generation of Power," and justify the title by giving in addition to the description of the boiler, a number of useful tables and articles on the combustion of coal, generation of steam, on feed pipes, etc. The boiler and its features are clearly described and illustrated. Many improvements have been made in this boiler, which not only increase its efficiency but improve its appearance. The tabular matter in this book has been well selected and carefully edited, and is taken largely from the works of well-known authorities on this subject. It will be sent on request.

"Forty Harvest Seasons" is the title of the latest publication of the Deering Harvester Co., of Chicago. Among many features interesting from a mechanical standpoint, one of the most conspicuous is the description and illustration of ball and roller bearings. In 1892 the Deering cold rolled rollers were introduced, along with hardened and polished steel balls. The hubs revolve against steel balls, which act in the place of washers, and on the main axle there are ball and roller bearings.

THE winter meeting of the Ohio Institute of Mining Engineers will be held at Columbus Jan. 19, 20 and 21. On Wednesday afternoon, Jan. 19, the society will unite with the Ohio Society of Civil Engineers in visiting the plants of the Jeffrey Mfg. Co. and the Kilbourne-Jacobs Mfg. Co. Sessions for the reading of papers will be held Wednesday evening, Thursday afternoon and evening, and Friday morning and afternoon. Electric motors, electric haulage and the improvements of 1897 in coal-handling machinery, are among the topics to be discussed.

THE repairs on the Johnson Co.'s blooming mill engine were finished last week and the plant has started up in all departments. It is a month since the engine was disabled. There are orders on hand sufficient to keep the plant running uninterruptedly for some months.

A TROY, N. Y., dispatch says that the big plant of the Troy Steel Co., on Breaker Island, which shut down in the last week in December, is not likely to resume operations at any early date. The principal reason given is that the Troy Steel Co. is unable to meet prices made by Pittsburg and other Pennsylvania steel works. The reorganization of the company and the erection of the new plant on Breaker Island in 1896 involved an outlay of about $1,000,000.

THE large shaft operating the rolls in the 40-inch mill at the Homestead Steel Works, broke Monday, causing the mill to shut down. The break is a serious one, and will throw the 40 men employed in both the 35 and 40-inch mills out of employment for over two weeks. The shaft is the largest in use and another will have to be cast to replace it.

INDUSTRIAL SUMMARY.

New Buyers in the Market, and Some of Their Wants :—

[If you are in need of machinery of any description, please notify *The Iron Trade Review*, and we will put you in communication with our advertisers at once.]

Lewis & Redpath, a new firm at Krebs, Ind. Terr., will start a foundry and machine shop, and are in the market for foundry equipment, lathes, drill presses and planers. They also want to purchase patterns for iron fronts for buildings, columns, pillars, etc., as well as for self-oiling mine car wheels. John Redpath, of the new firm was formerly secretary of the South McAlester Foundry & Machine Works, of South McAlester Ind. Terr. The plant will be ready for operation about March 1.

The International Machinery Co. has been incorporated at Wheeling, W. Va., with a capital stock of $100,000, to manufacture molds, castings and structural work. The incorporators are C. E. Blue, Jr., A. G. Hubbard and Gibson Lamb.

The Bison Mfg. Co., of Buffalo, has filed a certificate of incorporation, and will manufacture bicycles. The capital stock is $20,000. The directors are George Seyfang, G. Harry Gibbs, William Seyfang and George E. Buchheit.

The J. & J. B. Milholland Co., of Pittsburg, builders of hoisting engines and general machinists, has made application for a charter of incorporation. The incorporators are James Milholland, H. C. Milholland, Joseph McConnell, W. P. Potter and H. E. Lineaweaver.

At Sheffield, Ala., the Lizzie Lowman Stove Works, B. J. & S. A. Lowman proprietors (capital stock $10,000) are nearing completion and will start operations soon. The capacity for stoves is 30 daily, besides other foundry work.

At Murfreesboro, Tenn., the Brown Common Sense Harrow Co., capital stock $20,000, has been organized, with Joe P. McGregor, president; J. R. Nelson, treasurer; W. A. Ransom, Jr., secretary-treasurer. The company will build at once a factory for harrows, etc.

Hardy-Tynes Foundry & Machine Co., W. D. Tynes, secretary, Birmingham, Ala., is in the market for 30-inch vertical boring and turning mill, 30-inch shaper and 42-inch lathe, 20-feet centres; second-hand.

R. D. Cole Mfg. Co., Newnan, Ga., will buy good second-hand lathe, 20-inch swing, six feet between centres.

C. F. Hacker, 826 Sycamore st., Quincy, Ill., writes us that he is in the market for second-hand lathe, planes, drill press, shapes, and a 10 or 15-h. p. motor.

New Construction:—

Work of constructing the new open-hearth steel plant at Homestead was started last week by the Carnegie Steel Co. The Frank-Kneeland Machine Co. was awarded the contract for constructing the new 38-inch blooming mill. The improvements proposed to be made will amount to between $300,000 and $400,000. The blooming mill is said to be the largest of its kind in the world. Other improvements for the plants at Homestead and Braddock, under way in the past three weeks, are about completed.

The Harris Machinery Co., Minneapolis, Minn., is building a warehouse and machine shop, two stories high. It is to be equipped with modern machinery.

The Born Steel Range Co., of Cleveland, with plant located at Galion, O., is reported as planning to build a plant to employ 200 men, at Cleveland.

W. J. Adams will erect a three-story brick factory, 66x120, at Joliet, Ill., for the manufacture of wire fence and a general line of iron work.

S. E. Frew, box 66, Port Clinton, O., is building a bicycle repair shop, size 14x22, to have sheet steel or iron walls and roof. He will put in some small machine tools and may build an addition to be used for machine shop.

The Epping Carpenter Co., of Pittsburg, manufacturer of steam pumps, has had plans drawn for a new machine shop and other buildings. The machine shop will be 200 x 100 feet and some new machinery will be required.

Contracts for the material for four new locks on the Ohio River will be let this week by the Government contractors, Eichel, Arnold, Eigenman & Hollerbock, of Evansville, Ind. All contracts, it is expected, will be placed with Pittsburg concerns. They will aggregate about $1,000,000. Each lock will require the following: Cast iron, 176,083 pounds; wrought iron, 78,715 pounds; structural steel, 194,144 pounds; masonry, 35,000 cubic yards; timber, 683,550 feet; excavation, 53,084 cubic yards, and stone filling, 2,108 cubic feet.

The Riter-Conley Co., of Pittsburg, has received the contract for erecting a complete gas plant for the People's Gas Co., of Buffalo. It will cost $350,000. The plant will have a daily capacity of 2,000,000 cubic feet of water gas and about the same of coal gas. The buildings are to be of steel frame and will contain one large gas meter with a diameter of 175 feet and 125 feet high, with three lifts, and with a capacity of 1,750,000 cubic feet, and another small receiving holder with a capaity of 150,000 cubic feet of gas. The retort house will be about 200 x 80 feet. The purifying generator, boiler and pump houses will all be large steel structures. An oil tank 40 feet in diameter and 20 feet high and capable of holding 274,000 gallons of oil; will be included for the reception of crude oil. The boiler house will have capacity for six boilers, each six feet in diameter, 18 feet long and productive of 125 horse-power. It will also contain a steel stack 125 feet high.

The contract for the erection of the new rolling mill at Scottdale, Pa., has been let to the Shiffler Bridge Co., of Pittsburg.

The plant of the Ideal Farm Implement Co., Fort Madison, Ia., destroyed by fire recently, will be rebuilt at once.

At Homestead, Pa., the Homestead & Howard Land Co. subscribed $5,000 to a fund to secure the American Axe & Tool Co.'s plant for Homestead. Individuals have added $5,000 to this amount.

The Cornwall & Patterson Mfg. Co., Bridgeport, Conn., is building a factory 292 x 60 feet, and a boiler house 30 x 30 feet. A 100 h. p. engine and a 125 h. p. boiler will be installed.

The Hooven, Owens & Rentschler Co., of Hamilton, O., has awarded contracts in connection with the construction of its proposed $60,000 plant. The structural steel work went to the Columbus Bridge Co., and the contract for the remainder of the building to the J. F. Bender Bros. Co.

At Birmingham, Ala., J. T. Burns, of Pittsburg, is negotiating with the Commercial Club relative to the erection of a steel plant. Steel for the manufacture of edge tools under a patent process. Birmingham investors are asked to subscribe $200,000 and donate 100 acres of land.

Additions, Enlargements, Removals, Etc.:—

The Chicago, Milwaukee & St. Paul Railroad Co. is making improvements at the West Milwaukee shops that will cost in the neighborhood of $50,000. An addition 225x104 feet in size is being built to the freight car erecting shop. The addition will be equipped with expensive machinery.

An impression other than that intended might have been taken from the paragraph in our issue of Dec. 30 relative to the new departure of the Standard Boiler Co., of Chicago. The addition of a department to the business, in which the manufacture of a special line of tanks will be carried on under the company's patents, does not mean any less activity in the boiler department. On the contrary, the company intends in the near future to put up three new shops, 100 x 125 feet long, for the extension of its business. This move will give increased facilities for the manufacture of boilers, as well as for tank work, good orders being on hand in both departments.

Again has the Davis & Egan Machine Tool Co., of Cincinnati, increased its capacity. It has secured the plant formerly occupied by the Walton Iron Co., in Covington, Ky. The building is 300 x 100 feet, and with adjoining ground occupies an entire block. It is of modern construction and will be equipped with electric traveling cranes, electric generators, air hoists, hot air system, and all modern appliances. This new plant will simply be an addition to the Cincinnati works, and will be used for the manufacture of large lathes, planers and boring mills. It is located on the C. & O. R. R., with tracks running into it. The Davis & Egan Machine Tool Co. expects to have the new plant in operation within the next 60 days, employing a force of 300 men, making a total of 1,100 employees in the three plants.

Eastepp, Foster & Co., of Music, Ky., will remove their boiler and machine works to Gallatin, Tenn. New building will be erected, 24 x 110 feet.

COCHRANE HEATERS
FOR HEATING FEED WATER
FOR PURIFYING FEED WATER
USED BY MANY OF THE LARGEST AND BEST PLANTS IN THE U.S.
HARRISON SAFETY BOILER WORKS PHILADA. PA.
MANUFACTURERS.
FOR PURIFYING EXHAUST STEAM
FOR TAKING WATER OUT OF STEAM.
COCHRANE SEPARATORS

Fires and Accidents:—

The engine house of the stone crushing works at the Black Diamond Steel Works, Pittsburg, burned Jan. 8. Loss, $1,000.

The Milton Mfg. Co., Milton, Pa., sustained a loss of $17,000 by its recent fire, insurance one-half. The stock of bolts, nuts and washers was destroyed. The rolling mill, the forge, the machine bolt department, the hot press nut department, the washer factory, the threading and tapping department and the cold punched nut works were not damaged by the fire, and are in full operation.

General Industrial Notes:—

The furnace of the Allentown (Pa.) Iron Co., which has been in steady operation since spring, has been blown out for repairs.

The Pennsylvania Steel Co.'s plant at Steelton, Pa., will be occupied on full time for the next six weeks.

Furnace B, of the Edgar Thomson series at Braddock has been blown out. It will be relined and new hot blast stoves erected. A new hoist for conveyance of ore from stock yards furnace top will be put in and a new battery of Cahall boilers installed.

The Sheffield (Ala.) Coal, Iron & Steel Co. will complete the repairs on its furnace No. 3 by Feb. 10 and put it in blast; expected daily capacity 300 tons. Furnace No. 2, now running, is producing 250 to 280 tons per day.

The Virginia Coal & Iron Co. will build 200 more coke ovens this year.

No. 2 Paxton furnace at Harrisburg, Pa., will be repaired at once. This furnace has not been in blast since 1896. It is expected that its capacity will be doubled.

Orders have been issued for the early resumption of the North Branch Steel Works at Danville, Pa. This plant has done little work since fall, and will be operated in its rolling mill departments.

The Richmond Locomotive Works and the Baldwin Locomotive Works have each received an order for 15 locomotives for the Canadian Pacific. The C., B. & Q. Road has placed with the Pittsburg Locomotive works an order for 20 engines, of the six-wheel class, each to cost about $12,500. The Seaboard Air Line is in the market for seven locomotives and the Illinois Central has bought three and the Long Island Railroad has given an order for five passenger engines to the Brooks Locomotive works. The Boston & Main Road has increased its order with the Schenectady Locomotive Works from 8 to 10 ten-wheel compound engines. Car-building orders let and pending are as follows: Mobile & Ohio, about to buy 500 coal and 500 box cars. Lake Shore asks bids on 500 box, 250 coal and 250 ore cars. Cudahy Packing Co. orders 200 refrigerator cars from the Illinois Car & Equipment Co. The Ft. Wayne shops of the Pennsylvania lines are building 200 freight cars. Missouri Car & Foundry Co. has an order for 60 cars from the El Paso & Northeastern. Armour & Co. have ordered 1,000 refrigerator fruit cars. The C., M. & St. P. has ordered 500 box cars from the Terre Haute Car & Mfg. Co. The Cudahy Co. has placed an order with the Illinois Car & Equipment Co. for 200 refrigerator and tank cars. The Barney & Smith Car Co. and the Michigan Peninsular Car Co. divide equally the order for 1,000 new box cars for the Indiana, Decatur & Western. The big B. & O. order of a few weeks ago is said to have been placed as follows: 2,000 with the Michigan Peninsular Car Co., 500 with the Missouri Car & Foundry Co. and 3,000 box with Pullman's Palace Car Co. The Baltimore & Ohio Southwestern order for 1,000 cars is said to have been for 250 coal cars with the Ohio Falls Car Mfg. Co. and 750 box cars with Pullman's Palace Car Co.

The Morrison Foundry & Machine Co., Youngstown, O., is well employed and has orders that will keep a full force busy through the winter.

The Minnesota Iron & Steel Co.'s mills near Minneapolis are now in full operation under the new company, manufacturing iron and steel bars.

The Whitaker Foundry & Machine Shop at Kenosha, Wis., has been sold to Peter Lippert, of Chicago. The products are steel and cast iron wagon skeins, power and hand tire benders, shapers and core band formers.

The Hoffman & Billings Mfg. Co., of Milwaukee, Wis., has discontinued its Corliss engine department, and transferred it to the Rarig Engineering Co., of Columbus, O.

At Bayview, Wis., the Illinois Steel Co. is dismantling the old puddle mill, the old fish plate mill and the old 22-inch plate mill. The Milwaukee works are now entirely on a steel basis, but all the steel is shipped to the plant from the Illinois Steel Co.'s works at Chicago and Joliet. The next step will be to erect a steel converting plant at Milwaukee, but no plans have been made for this as yet.

Press dispatches announce that the Brilliant Iron Works, Brilliant, O., which have not been operated for several years, have been leased from the Wheeling bondholders by Col. Mullaney, of Bridgeport, who, after repairing the mill and coal shaft, will put the mill in operation and turn out muck and bar iron.

P. L. Kimberly has transferred the Sharon and Greenville, Pa., rolling mill properties to the new concern, P. L. Kimberly & Co., for $124,000. The Greenville mill will probably start Feb. 18.

Alexander Nimick, of Pittsburg, has brought suit in the Mercer County Court to have a settlement of the partnership affair of Bryce, Wheeler & Co., formerly owners of the Ella Furnace, West Middlesex, Pa.

The Homestead Steel Works started in full Sunday night. The Bethlehem Iron Co.'s works at South Bethlehem, Pa., are working overtime to push the delivery of war material. The company has just shipped two conning tower shields for the Japanese cruiser under construction at the Cramps' shipyard, Philadelphia, and 18 gun forgings to the Washington Navy Yard.

A recent deal in coking coal lands was the purchase by W. J. Rainey of 40 acres near Alverton, Pa. There are now 70 ovens on the tract.

The Leechburg Foundry & Machine Co., of Pittsburg, is installing a Mesta patent pickler in the plant of Marshall Bros. & Co., of Philadelphia.

Mitchell, Tranter & Co., of Covington, Ky., have ordered two more boilers from Hyde Bros. & Co., of Pittsburg. A

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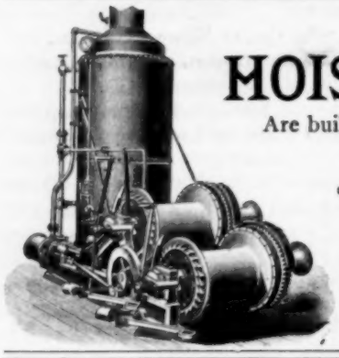

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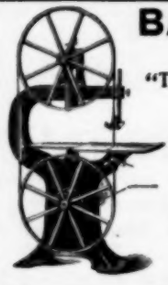

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former order, given last fall, was also for two Hyde boilers.

Norman Mitchell, a brick manufacturer of Kingston, Jamaica, was buying machinery in Pittsburg last week.

It is announced that the Washington Coal & Coke Co., of Uniontown, Pa., will shortly erect 350 new ovens and a steel tipple. Fifty new coke cars have already been ordered.

Chester B. Albree, of Allegheny, has received the order for the 17,000 feet of iron railing to be used on the Harlem River driveway. The foreign business of the company has been put in charge of Charles G. Eckstein & Co., of New York, who have foreign offices in Berlin, Vienna and Brussels.

The employees of the 10-inch mill at the Homestead Steel Works who refused to accept the 1898 scale, met last Friday and signed the scale. The company had decided to open the mill with other workmen, and rather than lose their places the men accepted the rearrangement. Work in the 10-inch mill was resumed on Sunday night.

The Ironton, O., *Register* gives the output of furnaces in Lawrence county in 1897, as follows, the total being 20,000 tons less than that of 1896, or about 30,000 tons less than the highest record for the county: Sarah, 27,000; Hamilton, 25,690; Belfont, 18,000; Vesuvius, 1,450; Lawrence, 3,000; Olive, 3,000; total, 77,140 tons. None of the furnaces ran steadily, but in the latter part of the year they were almost constantly in blast. The Kelly Nail Mill made 182,000 kegs of nails in 1897, the greatest product for several years. The Belfont Mill made 159,872 kegs of nails and 2,042 tons of muck iron. In 1896, the combined product of the two nail mills was 143,650 kegs of nails.

The borough council of Homestead, Pa., has asked the Carnegie Steel Co., Ltd., to pay the city $60,000 for the evacuation of several streets running through the property on which the company intends to erect the new universal plate mill. President Schwab, in reply has declined the proposition and intimates that other free sites have been offered the company. A committee of the council is to meet with officials of the company.

The Westinghouse Air Brake Co. secured an injunction in its suit against the Buffalo, Rochester & Pittsburg Railroad Co. to prevent the railroad company from using the air brakes made by the New York Air Brake Co., for the reason that they are an infringement upon the Westinghouse patent.

The Schultz Bridge & Iron Co., of McKee's Rocks, Pa., is building for the Inter-State Transportation & Transfer Co., of St. Louis, a large barge to be used in transporting freight cars across the Mississippi River at St. Louis.

The Thos. D. West Foundry Co., of Sharpsville, Pa., has increased wages of all employes 10 per cent.

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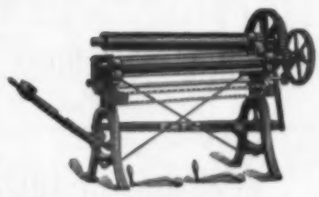

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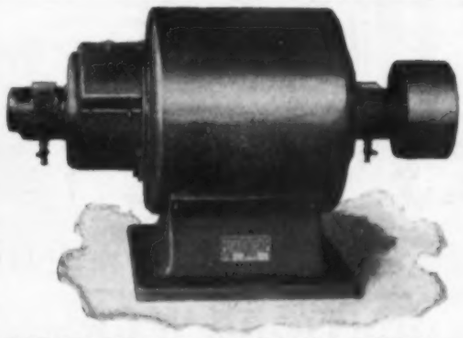

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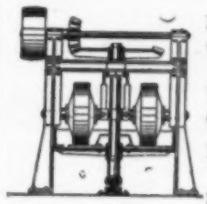

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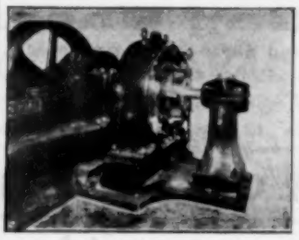

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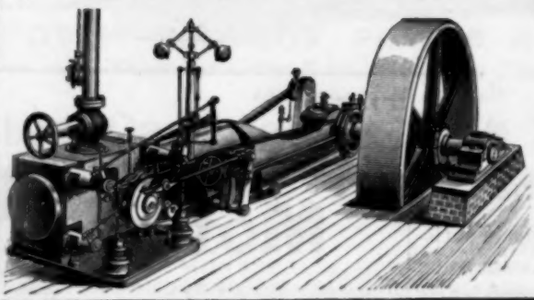

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Baltimore and Washington	* 1:40 pm	*11:25 am
Alliance and Pittsburgh	* 1:40 pm	*11:25 am
Ravenna and Alliance	* 5:00 pm	* 8:40 am
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FROM CLEVELAND TO	LEAVE	ARRIVE
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Akron and Columbus	* 8:50 am	* 5:30 pm
Akron and Columbus	† 1:40 pm	†12:10 pm
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Akron, Canton & Chicago	*8:10 A M	*6:45 P M
Akron, Canton & Wooster, Defiance, Garrett, Marietta, Wheeling, Washington, D. C., and Baltimore	†2:25 P M	†11:00 A

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